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CONSIDERATION OF THE REPORT OF THE SECRETARY-GENERAL ON THE STUDIES REQUESTED BY THE GENERAL ASSEMBLY IN ITS RESOLUTION 44/172 A ON THE IMPLEMENTATION OF THE PLAN OF ACTION TO COMBAT DESERTIFICATION

Note by the Executive Director

1. The General Assembly, at its forty-fourth session in 1989, having taken note of the report of the Secretary-General on the implementation of its resolutions 42/189 A, B and C of 11 December 1987 (A/44/351-E/1989/122) and of the relevant section of the report of the Governing Council of the United Nations Environment Programme (A/44/25, chapter VI), adopted its resolution 44/172 A of 19 December 1989, by which it invited the Governing Council of the United Nations Environment Programme to contribute substantially to the discussion on desertification at the United Nations Conference on Environment and Development, *inter alia*, by undertaking a general evaluation, sufficiently in advance of the Conference, of the progress achieved in implementing the Plan of Action. The response of the Governing Council is to be found in document UNEP/GCSS.III/3, the report of the Executive Director on the status of desertification and implementation of the United Nations Plan of Action to Combat Desertification.

2. In addition, by its resolution 44/172 A, the General Assembly requested the Secretary-General, in consultation with the Executive Director of the United Nations Environment Programme, to submit to the Conference, through its Preparatory Committee, a report containing relevant expert studies on, *inter alia*, the following:

(a) Relevant suggestions and proposals formulated within the United Nations system on the possibilities of utilizing new methods to finance the programmes of multilateral organizations at the global level, over and above regular budgets and conventional extrabudgetary resources;

(b) The state of implementation of the Plan of Action and objectives and courses of action to further the struggle against desertification, including an evaluation of the additional resources needed in order to attain the minimum objectives of the struggle against desertification;

(c) Ways and means of promoting, in particular in the developing countries, research into and development of existing and potential technology to combat desertification and procedures for the transfer of such technology on favourable terms, in particular to developing countries;

(d) Possibilities for obtaining loans on concessional terms, from Governments and other sources, to finance the struggle against desertification;

(e) Possibilities for reducing the impact of desertification, including reafforestation, with the help of mechanisms involving the cancellation or reduction of external debt;

(f) Possibilities for strengthening and coordinating the activities and funds established for that purpose in various international institutions;

(g) Ways of encouraging the active participation of non-governmental organizations in the financing of training and scientific research programmes to combat desertification, including reafforestation programmes.

The attached report is submitted in response to this series of requests.

Studies Requested by General Assembly Resolution 44/172 A on the

Implementation of The Plan of Action to Combat Desertification

REPORT

of

The Secretary-General

Nairobi
October 1991

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ABBREVIATIONS

ACP	African, Caribbean and Pacific States
ACSAD	Arab Centre for the Study of Arid Zones and Drylands
ADALCO	African Deserts and Arid Lands Committee
AMCEN	African Ministerial Conference on the Environment
CFCs	Chlorofluorocarbons
CGIAR	Consultative Group on International Agricultural Research
CGIF	Concept of a Global Infrastructure Fund
CILSS	Permanent Inter-State Committee on Drought Control in the Sahel
DESCON	Consultative Group for Desertification Control
DESCONAP	Regional Network of Research and Training Centres on Desertification Control in Asia and the Pacific
DOEM	Designated Officials on Environmental Matters
EC	European Communities
ESBs	Earth Saving Bonds
ESCAP	Economic and Social Commission for Asia and the Pacific
ESMAP	Energy Sector Management Assistance Programme
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
GNP	Gross National Product
IAWGD	Inter-Agency Working Group on Desertification
IBRD	International Bank for Reconstruction and Development
ICARDA	International Centre for Agricultural Research in the Dry Areas
ICASALS	International Centre for Arid and Semi-Arid Land Studies
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDA	International Development Association
IDRC	International Development Research Centre
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IGADD	Inter-Governmental Authority on Drought and Development
ILCA	International Livestock Centre for Africa
IMF	International Monetary Fund
LDCs	Least Developed Countries
NGOs	Non-Governmental Organizations
NOVIB	Netherlands Organization for International Development Cooperation
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
OPEC	Organization of Petroleum Exporting Countries
PACD	United Nations Plan of Action to Combat Desertification
R & D	Research and Development
SADCC	Southern African Development Coordination Conference
SAREC	Swedish Agency for Research Cooperation with Developing Countries
SDR	Special Drawing Rights
TDRP	Tropical Diseases Research Programme
TFAP	Tropical Forestry Action Plan
UNCED	United Nations Conference on Environment and Development
UNCOD	United Nations Conference on Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
UNSO	United Nations Sudano-Sahelian Office

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USAID	United States Agency for International Development
WFP	World Food Programme
WHO	World Health Organization
WMO	World Meteorological Organization
WRI	World Resources Institute

FOREWORD BY THE EXECUTIVE DIRECTOR OF UNEP

1. The United Nations General Assembly and the UNEP Governing Council have been concerned since 1977 with means for mobilizing resources for the implementation of the Plan of Action to Combat Desertification (PACD). The United Nations General Assembly requested a series of expert studies on financing the PACD and on modalities for ensuring the flow of resources on a sustained basis. Three of these studies were carried out in 1978, 1980, and 1981. Achievements remained modest; by its resolution 44/172 A of 19 December 1989, the United Nations General Assembly expressed its deep concern about the inadequacy of financial resources available for the implementation of the PACD.

2. Two important points must be emphasized. There is a need to mobilize political will in both the developing countries affected by desertification and the donor community so as to give the programme of desertification control its due priority. Secondly, desertification is a world-wide problem: it affects some 100 countries on all continents (including Australia, the USA, the USSR and some countries in southern Europe), not just the Sudano-Sahelian region of the continent of Africa. Its consequences for world food supply, climate (changes in ground albedo, increase of particulate materials in the atmosphere) and for genetic biodiversity (many crop and fodder plants and their wild relatives originated in the arid and semi-arid regions of the world) make desertification one of the major global problems. The struggle against desertification should be regarded as a significant contribution to the solution of those issues which are recognized as requiring a global response, such as biodiversity loss and climate change. All such issues call for an approach based on global interdependence, reflected, for example, in the sharing of knowledge (technology transfer); they also require an equitable sharing of cost. This is illustrated by the recently established Global Environment Facility (GEF). GEF is a pilot programme limited in its scale, but national and regional initiatives to combat desertification should qualify for its funding (as well as for any future financial resources appropriated for global environmental purposes).

3. The drylands of the world cover more than one third of the land surface of the earth (ca.52 million km^2, excluding hyper-arid natural deserts) and are inhabited by one sixth of the world's population. Environment and development interactions in these vast territories comprise four interrelated processes:

(a) Insurance against natural hazards of recurrent drought;

(b) Halting degradation of productive lands (including preventive measures);

(c) Reclaiming desertified lands; and

(d) Ecologically sound development of land and water resources in drylands.

4. Programmes for combating desertification integrate all four elements. Such programmes often require long gestation periods and their rates of return are low. They cannot compete with other demands in the market. (It must be remembered that agriculture even in developed areas still requires heavy government subsidies). For these reasons, the developing countries affected by desertification require support in financing their national programmes; this support needs to be long-term, adequate and sustained.

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5. General Assembly Resolution 44/172 A requested that seven topics be covered. The outlines of the studies were set out by an expert group which met in Geneva, July 1990; drafts were revised and elaborated by a second group of experts in international financing, which met in Nairobi from 21-23 February 1991; examined at a high level meeting held in Geneva from 10-12 July 1991, and finally reviewed by IAWGD at its eighteenth meeting in Geneva from 9-10 September 1991, and by DESCON at its eighth session in Geneva from 11-12 September 1991.

6. The groups' discussions included the following background issues:

- The place of combating desertification (implementation of the United Nations Plan of Action to Combat Desertification) on the international agenda for actions related to the environment and the development of the land and water resources of the world (food security and the satisfaction of basic needs of the global increasing population);

- The cost of implementing a world-wide programme for combating desertification, and the financial and technical assistance required to support the implementation of national programmes in developing countries;

- The sources of funds that could become available for global environment-and-development programmes, and the share of such resources that could be allocated to combating desertification;

- The new mechanism(s) that could be created, or existing mechanisms developed, to manage the process of mobilizing the financial and technical resources required to address global environment-and-development issues, including issues related to the world's drylands.

7. Throughout these meetings the expert groups have endeavoured to make the studies self-contained in responding to the request of the General Assembly. Reference may, however, be made to another technical study carried out by UNEP, namely The Status of desertification and implementation of the United Nations Plan of Action to Combat Desertification, issued in 1991.

8. The Executive Director of UNEP acknowledges the invaluable inputs of the groups of experts and the high level meeting which contributed to the preparation of this study. (The list of participants is contained in Annex II).

EXECUTIVE SUMMARY

1. In response to General Assembly resolution 44/172 A of 19 December 1989, a set of seven issues has been considered in this report:

- Studies carried out by experts since the United Nations Conference on Desertification (UNCOD 1977) on the possibility of utilizing new methods to finance anti-desertification programmes;

- The current state of implementation of the PACD and evaluation of additional resources needed in order to achieve its minimum objectives;

- Research into and development of technologies to combat desertification, as well as procedures for the transfer of such technologies on favourable terms, in particular to developing countries;

- Possibilities for obtaining loans on concessionary terms;

- Role of mechanisms involving the cancellation or reduction of external debts;

- Possibilities for strengthening and coordinating of funds established in various international institutions;

- Prospects of the active participation of NGOs, foundations and individuals in the financing of training and scientific research programmes for combating desertification, including afforestation and reafforestation.

2. The past studies, particularly the United Nations studies of 1978, 1980 and 1981, have been summarized and their main thrust and objectives underlined. All recommendations stemming from these studies, including the one on the establishment of an Independent Financial Corporation that could provide funding on concessionary bases to anti-desertification programmes, were presented to the General Assembly in 1980 and 1981, but were not acted upon.

3. In addition to the mechanisms and modalities identified in the past studies, new mechanisms and bodies recently established or proposed within the United Nations system have been examined. These include:

(a) The Tropical Forestry Action Plan (TFAP);

(b) The Energy Sector Management Action Programme (ESMAP);

(c) International Fund for Agricultural Development (IFAD);

(d) The Tropical Diseases Research Programme (TDR);

(e) The Consultative Group on International Agricultural Research (CGIAR);

(f) The Interim Multilateral Ozone Fund;

(g) Technical Assistance for the Mediterranean Countries;

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(h) Japanese Trust Fund at the World Bank;

(i) The Lomé Convention;

(j) Global Environment Facility (GEF).

4. Attention has also been drawn to a large number of proposals currently under discussion:

(a) Tax on Fossil Fuel Consumption;

(b) Proposal on Ecotourism in the International Conservation Financing Project Report prepared jointly by UNDP and the World Resources Institute (WRI) (September 1989);

(c) Concept of a Global Infrastructure Fund (GIF), a proposal of the Mitsubishi Research Institute (Tokyo, 1990);

(d) Proposal by the Italian Foreign Minister (1990) that the level of EC financial resource transfers to developing countries and Eastern Europe be raised to one per cent of GNP;

(e) The introduction of Earth Saving Bonds (ESBs), a possibility under continuing discussion in academic circles.

5. A survey of the activities of funds established in various international institutions for addressing world-wide environmental issues shows that financial and other resources available to them are meagre, inadequate to the requirements of anti-desertification programmes.

6. The current initiatives that deserve attention include:

(a) IFAD's approach to the internalization of ecological concerns into its lending operations;

(b) FAO's International Scheme for the Conservation and Rehabilitation of African Lands;

(c) The Global Environment Facility established to deal with environmental problems by the World Bank, UNDP and UNEP. Although the GEF was initially proposed to focus on climate change, ozone depletion, international waters and biodiversity, desertification is recognized as a global ecological problem that qualifies for inclusion;

(d) Financing under the Lomé IV Convention.

7. The Global Environment Facility is the first collective funding mechanism that can blend grants for global purposes with other funding sources of varying degrees of concessionality. Other mechanisms are in the offing and will be discussed in the preparations for UNCED, but it is doubtful if the needs for combating desertification will be met as effectively through a "miscellaneous funds" approach as through a single "portmanteau" fund. Compared to the special purpose funds negotiated to serve individual legal agreements (such as the Montreal Protocol), a single fund could be more receptive to grants. In many such programmes, a specific sustainability criterion - moving away from such factors as financial cost-benefit analysis and discount rates - must be adopted so that complementary measures are taken to realize a given environmental objective.

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8. The general conclusions of the six chapters of this study may be summarized as follows:

Chapter 1 (Sections I and II)

9. The conclusion that emerges in considering the proposals formulated within the United Nations system for utilizing new methods of financing programmes of multilateral organizations at the global level, is that the global community faces a complex urgency, and that it is necessary to determine the close inter-linkages that exist among poverty, international trade, transfer of technology, macro-economic policies in developing countries and the process of desertification. This is made explicit in the Fourth United Nations International Development Strategy adopted by the General Assembly. There are thus global and non-global issues in the financing of anti-desertification programmes. The formulation of the requirements of the PACD must be geared to attract funding. At the same time, however, approaches based on aid and charity must be replaced by a clear understanding and expectation of shared global responsibility and international cooperation.

10. As regards the design of the requirements of the PACD, the following improvements would be most helpful: (a) the concept of desertification should be better defined than it is at present for clearer public understanding; (b) an estimate of the minimum costs of assisting countries prone to desertification should be included along with (c) a breakdown of the costs into their different components and (d) high priority target areas.

11. All the available modalities and sources should be explored - aid, trade, encouragement of corporate initiatives and of cooperative ventures with the private sector, application of taxes, charges, users' fees, incentive and disincentive systems concerning the use of natural resources. In this exploration, two tasks are of particular importance:

(a) To quantify the additional financing to protect investments (in land productivity, irrigation works, rangeland management systems, etc.) and to contain the risks that new investments may pose to sustainable resource use and to environmental functions; and

(b) To identify a cross-sectoral framework to guide investment plans that will reflect specific institutional, physical and, above all, policy interventions that exist in a desertification prone country, so as to avoid *ad hoc* actions that can only compound costly mistakes made over time in different sectors.

12. It is clear that the totality of funds available in different institutions for anti-desertification activities is inadequate to the requirements of an integrated programme.

Chapter 2

13. A comparison of costs as estimated in the 1980 assessment, together with those estimated in the 1991 assessment, showed that the cost increase varied from 95 per cent for rangeland to 383 per cent for irrigated land and 135 per cent for rainfed cropland.

14. The percentage increase in the desertified area to be rehabilitated is 25 per cent, while the immediate total cost of a 20-year rehabilitation programme has increased by 179 per cent. These costs are escalating rapidly, reinforcing the fact that in dealing with environmental damages it is highly desirable to take early action.

15. The benefits, even for the 1991 figures, (whose estimated damage is reflected in income losses per year of $42.3 billion) are much higher than the cost of corrective measures (approximately $10.6 billion per year). It would, however, be misleading to attempt a financial cost-benefit analysis because the time profiles of the costs and benefits differ significantly. Anti-desertification programmes have a long gestation period and benefits do not appear until many years later.

16. It may be worthwhile to scale down the cost figures, (and thus the need for financing assistance), to manageable amounts by dealing with shorter time horizons (5 years instead of 20 years, for instance), high priority activities as against lower priority ones, the use of available technology rather than imported ones, etc.

Chapter 3

17. A number of technologies appear to hold significant promise for desertification control. Potentially, all the following are applicable to land uses in rangeland, rainfed arable agriculture, irrigated crops and orchards, and woodlands:

- Agroforestry;
- Soil conservation techniques;
- Water conservation, water conveyance and water harvesting;
- Soil fertility enhancement;
- Alternate income sources;
- Renewable energy sources;
- Renewable energy.

18. World-wide efforts and resources are needed to address the following inseparable issues:

(a) To assist developing countries to develop national capabilities in science and technology pertaining to desertification control and to development of land resources in drylands;

(b) To establish (or develop existing) international institutions capable of assisting developing countries with the technical and managerial problems related to technology transfer, and

(c) To provide, within resources eventually available for implementing the PACD, clearly defined appropriations for assistance in fields of science and technology.

Chapter 4

19. The GEF is the first approximation to a financing mechanism that blends concessionary and non-concessionary financing, but other mechanisms are also in the offing. It is necessary to take a more receptive approach to grants and concessionary financing for anti-desertification programmes. In many such

programmes, a specific sustainability criterion - moving away from such factors as financial cost-benefit analysis and discount rates - must be adopted so that complementary measures are taken in hand to realize a given environmental objective.

Chapter 5

20. The international debt strategy could be improved. Several policy initiatives currently under discussion should be encouraged. In realistic terms, however, the linking of debt cancellation with the financing of programmes to redress desertification is fraught with a variety of difficulties. First, many of the desertification-prone countries are in such severe states of economic and financial impoverishment that any relief from debt is normally earmarked for actions that are considered for higher priorities. The funds released from debt cancellation would lead to the provision of greater resources for the protection of the environment, rehabilitation of land productivity, improvement of rangelands, extension of irrigation facilities, etc., all of which are very important development actions. Secondly, desertification-prone countries are often willing to allocate funds that become available to them to development purposes that include these activities. Thirdly, the central issue in the financial management of these countries is one of evaluating emerging needs. In the calculus of needs and benefits (often essentially short-term), projects and programmes would have to justify themselves as major and urgent concerns in order to be placed high on the list of priorities. Finally, it must be kept in mind that many OECD countries, the principal sources of bilateral assistance, have announced their willingness to treat debt reduction or cancellation more sympathetically if it is linked to natural resources conservation.

Chapter 6

21. NGOs in developing countries have a special role to play. First, many NGOs at the developing country level constitute effective pressure groups in favour of environmental action. Secondly, through community groups at the local level, they act in favour of natural resources conservation, including measures that have a direct bearing on land degradation and desertification. Thirdly, the NGOs, because of their knowledge of local conditions and specific ecosystems, could make a substantive contribution in the implementation of anti-desertification activities. Finally, the total package of resources needed for anti-desertification programmes must include a number of components apart from funds. These are human resources, time given to protection of the environment, operational activities in the field, etc., that call for NGO assistance.

22. Foundations have played an important role in supporting ICRISAT in anti-desertification actions and funding research by the CGIAR. Such involvement by foundations in training and research could be strengthened and coordinated further.

23. Individuals could participate, as has been the case with UNICEF activities, through such mechanisms as the Earth Saving Bonds.

INTRODUCTION

I. BACKGROUND

1. The United Nations Conference on Desertification (UNCOD), held in 1977, established that desertification was one of the major environmental and natural resource degradation problems of the globe and that its costs in human, social and economic terms were extremely high. UNCOD adopted a Plan of Action to Combat Desertification (PACD) of which Recommendation 28 dealt with financial mechanisms. Briefly, in 1980 a twenty year world-wide programme to arrest further desertification was estimated to require about $4.5 billion a year of which developing countries in need of financial assistance would require $2.4 billion a year or $48 billion for twenty years.

2. The current perception of desertification is that it is land degradation in arid, semi-arid and dry sub-humid areas resulting mainly from adverse human impact. This perception sets desertification within a broader framework of world-wide degradation of land resources. Land includes soil and water resources, land surface and vegetation or crops. Degradation implies reduction of resource potential.

3. Recently, there has been some confusion between two different processes: the one called "desertification", the other "expansion and contraction of the desert". Desertification is often related to the incidence of drought: total failure of rainfall or less than annual average rainfall. It is important, however, to recognize that desertification is a discrete process of land degradation throughout the drylands and quite different from the phenomenon of observed cyclic oscillations of vegetation productivity at desert fringes. The latter often leads to what is commonly termed "expansion or contraction" of the desert as revealed by satellite data and related climate fluctuations. But this is a phenomenon completely different from that of desertification.

4. All over the world extensive areas of productive land are subject to ecological degradation. Damage is primarily due to excessive use. Exploitation beyond the carrying capacity of the rangelands, cutting forest trees at rates faster than their regeneration rates, and over-dosing farmlands with irrigation water or agrochemicals are examples of unsustainable use. Reduction of plant cover leads to accelerated soil erosion and other forms of deterioration of the physical, chemical and biological attributes of soil and of the productive capacity of the land.

5. In summary, desertification is a form of ecological degradation of the productive land-and-water systems due to a combination of the inherent fragility of the systems and overtaxing exploitation. This is a significant failure in resource management that significantly reduces world capabilities to produce food and other basic requirements for the escalating human population.

6. Desertification, like other forms of land degradation can be stopped. In most instances there is enough technological and scientific knowledge to implement programmes for combating desertification in the field. Residual research needs relate to a limited number of gaps in knowledge or to exploration of novel means that may make halting desertification and the utilization of arid land resources more economically attractive and sustainable. Certain countries, mostly in the developed industrialized world, have the technical, managerial and financial resources that enable them to cope with the menaces of desertification. For instance, during the 1930s, the arid, semi-arid and sub-humid territories of the USA faced the desertification dangers manifested by the events of the dust bowl. This typical incidence of

desertification was the result of a combination of excessive pressures of ill-advised land-use systems (human impact) and the onset of years of drought (natural vulnerability). The management packet that enabled these same lands to face similar drought in the 1950s without much noticeable damage combined government control (legal instruments), government guidance (land-use policy), government financial assistance ($15,000 million in federal subsidies to threatened areas from 1935 to 1975), national development schemes (railways, roads, water reservoirs, etc.) and application of science and technology (soil conservation, new pumps for tapping deep groundwater aquifers, new breeds of cattle, etc.).

7. Developing countries are hard hit by desertification, and need both technical and financial assistance to enable them to: (a) develop their national capabilities, (scientific, technological and managerial) to cope with its hazards; and (b) implement programmes for combating desertification and ensuring sustainable development of land resources. In many of these countries, desertification is the principal environmental threat. It undermines life support systems and exacerbates chronic food shortages. In this context, desertification takes on the magnitude and urgency of a major environment and development problem warranting the special attention of the international community.

8. Like all serious environmental hazards, desertification has its local on-site manifestations related to loss of productive land and its off-site impacts far beyond. Food shortages (famine, in the extreme situations), may drive people to other areas within the country or across national borders. These environmental refugees have been the cause of civil strife and international political strains. Political instability often diverts attention from development activities that combat or reduce the impacts of desertification hazards, so that the situation worsens.

II. BENEFITS OF ANTI-DESERTIFICATION PROGRAMMES

9. As it spreads world-wide, desertification has a number of adverse global impacts. These impacts constitute the cost of desertification. The *first*, concerns a reduction of global food production and its impacts on socio-economic status, contributing to poverty among other undesirable effects. There is evidence that food production in those countries most in need of food supplies will be seriously disrupted. *Second* is the impact of desertification on local and global climate. Desertified territories are sources of atmospheric dust that modifies the dissemination and absorption of solar radiation in the atmosphere. Its effect on temperature depends on the altitude at which it is borne. Desertified lands have a much increased albedo (reduced capability for absorption of solar radiation by the ground), which causes less heat transfer to the atmosphere, which in turn causes air subsidence and less rainfall. As the total area of climatic deserts and degraded (desertified) lands mount to 62 million km^2 - about 40 per cent of the Earth's surface - the climatic impact of the increased albedo will be inescapable.

10. The extensive areas of dryland territories (natural deserts and semi-deserts plus desertified lands), provide virtually no sinks for carbon dioxide. They do, however, provide space for programmes of afforestation and other forms of plant growth. The greening of these non-vegetated or poorly vegetated areas would enhance the global sinks for greenhouse gases. Indeed, the economic feasibility of this kind of enterprise may be more attractive than some of the proposed actions for other means to abate carbon dioxide emissions.

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11. The third adverse impact relates to the off-site environmental effects, which include air pollution and floods, among other damage.

12. Fourth, as desertification entails the destruction of vegetation and the diminution of many plant populations and their associate biota, one of its significant results is loss of species. Many crops (wheat, barley, sorghum, millet, etc.) and fodder species, which constitute the backbone of world agriculture and pastoral husbandry, have their origins in arid and semi-arid territories that are prone to desertification. For instance, many cereals, legumes and clovers originally came from the eastern Mediterranean region. The loss of populations of these plants and their wild relatives represents a loss of invaluable and irreplaceable genetic resources. The impact of desertification on loss of germ plasm resources may, from an economic and food security standpoint, approach the impact of deforestation.

13. These costs are the damages inflicted by the process of desertification on local communities, national economies and global well-being. The abatement of these costs constitute the *benefits* derived from anti-desertification programmes.

14. In 1975, the General Assembly had adopted resolution 3362 (S-VII) which reads in part:

> "Concessionary financial resources to developing countries need to be increased substantially, their terms and conditions ameliorated and their flow made predictable, continuous and increasingly assured so as to facilitate the implementation by developing countries of long-term programmes for economic and social development."

The Plan of Action to Combat Desertification (PACD) adopted by the United Nations Conference on Desertification (UNCOD, 1977) requested a study of additional measures and means of financing including "fiscal measures entailing automaticity". This was based on the reasoning that if long-term programmes for economic and social development needed concessionary financial resources on "predictable, continuous and increasingly assessed" terms, combating major environmental threats such as desertification clearly deserved similar support.

III. CORRECTIVE COSTS AND COSTS OF INACTION

15. Budgetary resources available to multilateral organizations at the global level are becoming increasingly constrained. This applies equally to UNEP, which is charged with the coordination of the implementation of the PACD. It is not feasible to envisage a realistic and effective contribution to the total financial requirements of the PACD, which were estimated in 1980, as noted earlier, at $4.5 billion a year. This figure is to be seen in the context of the loss of productive capacity (income foregone: $26 billion a year). The figure for income forgone has now risen in terms of the 1991 Assessment to $42.3 billion.

16. The global direct annual loss (income foregone) of US $42.3 billion is a rough average estimate, as the actual figures vary greatly from country to country and from continent to continent. This figure simply shows the order of magnitude of the loss involved. It also shows that the cost of inaction over the next 20 years will be of the order of US$850 billion as compared with the earlier estimate of US$520 billion.

17. Activities undertaken to combat desertification (corrective measures in damaged lands or preventive measures in productive lands) are inseparable from actions for resource development and management in the drylands. Schemes that aim at arresting the degradation of rangelands, rainfed and irrigated croplands, such as sand dune stabilization, the establishment of large-scale green belts, the introduction of soil and water conservation systems in resource management, or reclamation of new areas for productive use, are likely to be costly. In the majority of the developing countries fully or partly dependent on their dryland resource base, which have accumulated problems of poverty and underdevelopment, the costs will be higher. The rehabilitation projects are generally non-competitive in terms of market values, especially when compared with prevalent rates of interest. Investments in land rehabilitation projects commonly do not pay well financially, but their social and humanitarian value as means of ensuring food security and popular participation in development are immense.

18. The costs of direct corrective measures in areas affected at least moderately by desertification (in million US$) could be calculated as shown in the following Table:

	Area to be reclaimed as a first priority, in million hectares	Average cost of reclamation per one hectare, US$	Total cost of reclamation, million US$
Irrigated land	43 (100%)*	2 000	86 000
Rainfed cropland	151 (70%)*	400	60 400
Rangeland	1 667 (50%)*	40	66 680
Total	1 861		213 080

* Per cent of the affected area.

19. As compared with the 1980 estimate of US$90 billion, the present estimate of US$213 billion is 2.4 times higher, mainly because of more accurate land degradation assessment and the increase of world prices and costs of reclamation. If the present programme of first priority direct corrective measures is to be implemented within the next 20 years, it will cost US$10.6 billion a year in comparison with the US$4.5 billion a year estimated in 1980. Of this amount of US$10.6 billion, the developing countries in need of financial assistance would require about US$6.5 billion a year. Thus the cost of corrective action is high but the cost of inaction is still higher. As stated in paragraph 16 above, it amounts to US$42.3 billion a year.

IV. SOURCES OF FINANCING AND NATURE OF FINANCING MECHANISM(S)

20. It is useful to look at a spectrum of sources of assistance if international efforts for implementing the PACD are to be organized on the basis of global needs and a sense of a global partnership. Such international support should consist of:

- Multilateral and bilateral assistance, preferably on the basis of grants and concessional loans;

- Provision of technical assistance on a need basis;

- A regional approach to anti-desertification programmes; as this has been found promising, existing arrangements along these lines should be developed further and new avenues explored;

- Development of appropriate anti-desertification technologies and technology transfer to the needy countries on favourable terms;

- Monitoring and coordination of the anti-desertification campaign at a global level;

- Information exchange;

- International legislation.

21. The sources of financing the PACD could thus vary and may include the following:

- National budgets;

- Funding by national private and cooperative, state and local financial institutions;

- Debt-for-PACD swaps;

- Funding by major international financing agencies like the World Bank, IFAD, WFP, the regional development banks;

- Bilateral aid agencies;

- Funding and in-kind participation of international, regional, national and local NGOs;

- Funding and assistance from major international agencies like UNDP, FAO, UNEP, Unesco, WMO, WHO, in their respective fields of interest;

- Additional funds mobilized by the world community specifically for the PACD implementation;

- Global Environmental Facility of the World Bank/UNDP/UNEP.

22. In connection with the global assessment of the cost of desertification, there is a need to carry out a set of case studies in a representative group of countries that would permit the identification of more accurate figures of the level of financing required for anti-desertification programmes. Countries address desertification problems in a variety of ways and in different sectors, such as agriculture, human settlements, soil and water conservation, irrigation, range management, and food production. These activities account for both direct financial and indirect contributions by the countries affected by desertification. In addition, people at the local level - farmers, community groups, local bodies - contribute a great deal.

23. It would also seem now appropriate and timely to explore possibilities for attracting investment capital, which can play a major role, in locations that provide opportunities for such investments. One prospect that definitely needs further exploration is ecotourism. Another is the exploitation of the high value potential of certain regions and localities in respect of game ranching, wildlife products, and other possible productive activities.

24. It is necessary to give thought to innovative financial mechanisms that will permit raising of new and additional funding to solve major global problems. This would permit undertaking the different activities that constitute an effective programme for combating desertification, give the process a momentum commensurate with its urgency, and orchestrate a wide ranging and purposeful effort.

V. REQUEST OF THE UNITED NATIONS GENERAL ASSEMBLY (TERMS OF REFERENCE OF THE STUDY)

25. By its resolution 44/172 A of 19 December 1989, the General Assembly requested the Secretary-General, in consultation with the Executive Director of the United Nations Environment Programme, to submit to the United Nations Conference on Environment and Development, through its Preparatory Committee, a report containing relevant expert studies on, *inter alia*, the following topics:

(a) Relevant suggestions and proposals formulated within the United Nations system on the possibility of utilizing new methods to finance the programmes of multilateral organizations at the global level, over and above regular budgets and conventional extra-budgetary resources;

(b) The state of implementation of the Plan of Action to Combat Desertification, objectives and courses of action to further the struggle against desertification, including an evaluation of the additional resources needed in order to attain the minimum objectives of the struggle against desertification;

(c) Ways and means of promoting, in particular in the developing countries, research into and development of existing and potential technology to combat desertification, and procedures for the transfer of such technology on favourable terms, in particular to developing countries;

(d) Possibilities for obtaining loans on concessionary terms from Governments and other sources of financing to combat desertification;

(e) Possibilities for reducing the impact of desertification, including reafforestation, through mechanisms involving the cancellation or reduction of external debts;

(f) Possibilities for strengthening and coordinating the activities of funds established (for that purpose) in various international institutions;

(g) Ways of encouraging the active participation of non-governmental organizations, foundations and individuals in the financing of training and scientific research programmes for combating desertification, including reafforestation.

26. The present report is structured on the basis of the above seven topics. It takes into full consideration the three expert studies carried out on these and related topics in 1978, 1980 and 1981 under General Assembly guidance, as well as the new related initiatives that have since emerged.

CHAPTER 1

Section I

Proposals formulated within the United Nations System for utilizing new methods to finance the programmes of multilateral organizations at the global level, over and above regular budgets and conventional extra budgetary resources

A. GENERAL ASSEMBLY RESOLUTION 32/172 CONCERNING THE RECOMMENDATION OF UNCOD

1. The inadequacy and lack of availability of financial resources that would permit a meaningful implementation of the PACD described in paragraphs 15 to 19 of the Introduction, represents a compelling reality that exists not only for the PACD, but all other large environmental programmes that are inherently not self-financing or require a threshold level of capital for effective action. Paragraph 104 of the PACD reads:

> "(e) *Additional measures*
>
> "The General Assembly should be invited to request the Governing Council of UNEP to have prepared, by a small group of high-level specialists in international financing of projects and programmes, a study of additional measures and means of financing for the implementation of the Plan of Action as adopted by the Conference, such as funds in trust, fiscal measures entailing automaticity, and an international fund, and to submit a final report on the subject of additional measures of financing to the General Assembly at its thirty-third session, through the Economic and Social Council."

2. It was in this context that the General Assembly adopted resolution 32/172 on the recommendations of UNCOD. The resolution, among other recommendations,

> "Calls upon all countries, in particular developed countries, as well as multilateral financial institutions and non-governmental donors, to provide and increase their assistance to countries suffering from desertification, especially for the financing of their subregional and regional programmes and projects within appropriate consortium arrangements, such as those pertaining to the Sahel green belt, and urges developing countries to give due priority to desertification problems in their development assistance requests."

B. UNITED NATIONS STUDIES IN 1978, 1980 AND 1981

3. The General Assembly also decided to have prepared, by a small group of high-level specialists in the international financing of projects and programmes, a study of *Additional Measures and Means of Financing the Implementation of the PACD (1978)*. After consideration of the study, and as part of its continuing search for a solution to the problem of financing, the General Assembly requested a second study to deal with the following aspects of funding:

(a) A complete inventory of relevant ideas and proposals put forward in the United Nations System of possible new ways and means to finance programmes of multilateral organizations at the world level, additional to regular assessed budgets and conventional extra-budgetary resources;

(b) A financial plan and analysis outlining the components and costs of a programme to stop further desertification and identifying what is already being financed and what additional resources may be needed to meet the minimum objectives of stopping the spread of desertification;

(c) Methods for the mobilization of domestic resources;

(d) The practicality of obtaining loans from Governments and world capital markets on a concessionary basis;

(e) The feasibility of the creation of a public international corporation that would attract investments from countries, as well as institutions, and would provide financing for suitable anti-desertification projects with non-commercial rates of return;

(f) The means for encouraging the active participation of foundations in the financing of anti-desertification training and research programmes.

4. The second study (1980) was presented to the General Assembly at its thirty-fifth session. After it had been discussed, the Assembly requested the Secretary-General to prepare:

(i) Feasibility studies and concrete recommendations for the implementation of the additional means of financing deemed practicable by the Secretary-General, including those providing for a predictable flow of funds;

(ii) The detailed modalities of obtaining resources on a concessionary basis;

(iii) A full feasibility study and working plan for the establishment of an independent operational financial corporation for the financing of desertification projects.

5. The third study, entitled *Feasibility Studies on and Detailed Modalities for Financing the PACD*, was presented to the General Assembly at its thirty-sixth session in 1981.

6. The three successive studies attempted to evaluate the *feasibility* and *practicability* of the specific proposals for new and innovative means of financing mooted from time to time within the United Nations system. The major proposals and suggestions put forward in the three studies are briefly summarized in the following sections.

7. In a number of aspects, the second study is similar to the study that the General Assembly is now requesting. Certain elements are given less emphasis and certain other elements are brought forward as deserving greater attention. These latter elements are:

- An evaluation of the present state of implementation of the PACD, including an evaluation of the additional resources needed in order to attain the minimum objectives of the struggle against desertification;

- Research into potential technology to combat desertification and its transfer on favourable terms to developing countries;

- Impact of the reduction of external debt on desertification, including reafforestation;

- Strengthening and coordinating the activities of funds established in international institutions, so as to contribute to anti-desertification programmes;

- Active participation of NGOs, foundations and individuals in financing of training and scientific research programmes for combating desertification, including reafforestation.

1. *Study of Additional Measures and Means of Financing the Implementation of the PACD (1978)*

8. This study concentrated on external (as opposed to domestic) sources of financing for the PACD, making a distinction between: (a) funds supplied or raised specifically for anti-desertification projects and programmes; and (b) a possible share of new sources of financing established for general development and environmental purposes that may be allocated for anti-desertification purposes.

(a) Funds provided expressly for anti-desertification programmes

(i) *Assistance from developed countries affected by desertification*: It was considered that many of these countries had the experience, knowledge and capital resources to deal effectively with anti-desertification programmes and could be expected to take the initiative in accelerating a global effort;

(ii) *Increase in ODA*: It was considered that not only the overall levels of ODA from donor countries should increase, but that, given the importance of anti-desertification activities, a higher priority should be assigned to such activities in the establishment of expenditure guidelines based on requests from desertification-prone countries to demonstrate this priority;

(iii) *Loans from national Governments and world capital markets*: Government lending must come from the developed countries and from countries with substantial financial assets derived from such resources as petroleum. Lending would need to be on concessionary terms because:

- Anti-desertification projects often have long gestation periods and benefits do not necessarily emerge as cash flows applicable to the repayment of principal and interest; and

- Most developing countries affected by desertification have limited debt-servicing capacities.

Established international financial institutions mobilize resources by selling securities in world capital markets. They could raise additional resources in this manner to help finance anti-desertification programmes. The funds thus obtained, however, would involve commercial terms in their interest rates and repayment periods and therefore would not meet the development financing requirements of the majority of the countries concerned, which will need outright grants. In a few special situations, anti-desertification projects will produce cash incomes or increases in land values that could be taxed to yield funds that would better enable the Governments concerned to service external loans. However, as indicated above, the benefits of anti-desertification measures usually do not appear

in the form of readily identifiable and taxable cash flows. Furthermore, most of the countries severely affected by desertification already face serious balance-of-payments difficulties.

(iv) *Equity investment*: Private investing, based on immediate and high rates of returns for investors, has not been looked upon in the past as a substantial source of funds for anti-desertification programmes *per se*, which are mainly in the public sector. There are, however, multi-purpose programmes with anti-desertification aspects in which private sector participation could be useful. Similarly, there will be anti-desertification programmes with components in which the private sector can clearly play a useful role (e.g. in the marketing of livestock and agricultural products).

(v) *Foundations*: Foundations could play a useful role, but their resources are limited and are usually devoted to special purposes, mainly in research and training. They could be encouraged to play a catalytic role and participate in financing training and research programmes, for example, in the development of drought-resistant and salt tolerant crops, solar stoves, sand-dune fixation and the like.

(b) Share of new sources of financing established for general development purposes

9. International needs fall into two categories, namely:

(i) The need to transfer resources to the developing nations to assist them in improving the living standards of their people; and

(ii) The need to meet the financial requirements of various agreed international programmes.

10. The PACD is clearly an international programme of action that should have a share of new sources of financing identified for general development purposes. Such new sources of financing could be based on "the *exploitation of the international commons, taxation of defence expenditures and arms transfers, a development link with SDR, and the taxation of international trade flows.*"

11. The study noted that the burden of the different sources of financing, either in total magnitude or in relation to GNP, would not be equal on all countries, but concluded that (a) differential burden was an "unavoidable attribute of all workable revenue systems, both national and international", and (b) the burden should be directly related to the level of economic growth: e.g, the poor countries might be permitted to retain part or all of the funds they collect for international purposes, as in the case of trade taxes, or select sources of revenue that by their nature fall more heavily on the rich than on the poor countries (as in the case of the SDR-link).

12. The study also considered the consequences that would arise from a decision by the international community to establish new sources of financing for global programmes of development or for environmental protection, involving the principle of automaticity. These consequences* would include:

(i) Provisions for the generation and collection of the funds would have to be agreed upon by international treaty;

(ii) Except in the case of the SDR link, the Governments would have to act as agents for the collection of funds and for channelling them to some central international authority;

(iii) Thirdly, there would be a need for a central international mechanism for the collection of funds;

(iv) Fourthly, some kind of policy board would be needed for allocating the funds among the different agencies, sectors and fields of activity; and

(v) Finally, an appropriate intergovernmental body would have to be assigned the responsibility for the programming and expenditure of the share of such general development funds allocated for anti-desertification measures.

2. *Study on financing the PACD (1980)*

13. In this study's summary of findings, it was noted that most of the funds required to carry out the financial plan to combat desertification would have to be raised externally and that initial requirements for external assistance would of necessity be met exclusively from conventional sources, principally grants and concessionary loans from Governments and international finance institutions. As the scale of anti-desertification efforts grew, however, other sources of finance would be needed. Loans from international capital markets would require the services of an intermediary, such as the World Bank or one of the regional development banks. If existing institutions were unwilling to undertake this task, a public international corporation could be chartered independently or could be established as an affiliate of an existing institution. However, because of the limited ability of the affected developing countries to service even concessionary loans, borrowings in capital markets could meet only a small part of the requirements. New means of financing would need to be found. Such new means of financing had to be "administratively feasible, create no severe inequities, and possess a degree of automaticity".

(a) Inventory of means of financing involving automaticity proposed in the United Nations system

14. The following inventory is classified according to function, not importance:

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* It is interesting to note that many of these elements now find expression in the development of the Global Environment Facility. For example, the GEF has set up a Global Environment Trust Fund for the collection of funds, and an Implementation Committee consisting of the World Bank, UNDP and UNEP has been established to determine the allocation of funds between the three agencies, sectors and fields of activities.

(i) International taxation of trade flows, revenue taxes:

- General trade tax;
- Specific traded commodities, including oil and other exhaustible materials;
- Invisibles;

(ii) Tax on reverse transfer of technology;

(iii) Tax on surpluses in balance of trade;

(iv) Consumption taxes;

(v) Income from the use of the international commons:

- Ocean resources;
- The moon;
- Telecommunications and satellites in geosynchronous orbits;
- Taxes on polluters of the marine environment;

(vi) Revenues from off-shore resources;

(vii) Military taxes:

- Taxation of military expenditures;
- Taxation of arms transfer;
- Tax on possession of military weapons;

(viii) Savings from disarmament;

(ix) Special drawing rights (SDR)-development link;

(x) Proceeds from IMF gold sales;

(xi) Commodities Stabilization and the Common Fund;

(xii) Other fiscal measures involving automaticity (including the establishment of a world-wide lottery under the auspices of the United Nations and a tax-like proposal for the introduction of special contributions by multinational corporations operating in developing countries).

15. In an evaluation of the inventory, the 1980 study concluded that "among the large number of proposals listed in this inventory, several appear to be feasible, practicable or attainable in the near future. These measures could raise funds for any agreed international purpose, including combating desertification". Measures considered most likely to be realized in the near future "in terms of timeliness, practicability and feasibility" were the system of gold sales by the IMF; an SDR development link; the Integrated Programme for Commodities, including the International Commodity Agreements and the Common Fund; exploitation of non-living ocean resources, international trade taxes, and the charging of fees for "parking slots" of satellites in geostationary orbit.

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(b) Practicality of obtaining loans from Governments and world capital markets on a concessionary basis

16. As far as bank loans from foreign government sources were concerned, the study noted that competing demands on these resources did not permit much optimism for the successful funding of desertification control projects.

17. In respect of loans from world capital markets, it was pointed out that the use of an intermediary finance institution was essential, whether such an institution already existed (e.g., the World Bank, IDA and regional development banks) or would have to be created (e.g., an international public corporation).

18. For a more detailed examination of the subject, see Chapter 4.

(c) Proposed Public International Corporation for financing anti-desertification projects

19. The study pointed out that the feasibility of establishing a public international corporation depended on whether donor countries and organizations were willing to provide the resources necessary for its establishment. Its primary purpose would be to finance projects which, for the most part, could not bear interest costs, even on the highly concessionary terms currently available through IDA and similar financing institutions. The corporation would therefore have to operate with funds provided on an interest-free basis. Different possibilities of establishing the corporation, either as an affiliate or subsidiary of an existing institution or as an independent institution, were explored. The conclusion reached was that if the proposed new financial institution were established in the form of a public international corporation, it would have the operational flexibility and management efficiency that could commend its activities to potential suppliers of funds. Assuming efficient managerial leadership, a public international corporation could readily be expected to attract a nucleus of uniquely-qualified staff with a degree of specialized expertise in the anti-desertification field. It should not therefore be precluded from extending the range of its services to projects that could be funded on a basis that would assure over time a return of capital and even, in some cases, modest interest charges. To the extent that the corporation was able to establish a sound record of managing such projects, it would be reasonable to expect that it would attract funds from sources that would not otherwise be interested. The establishment of such a corporation as an affiliate would have the advantage of partaking of the reputation, facilities and expertise of the established institution; thus it would also benefit from a shortening of the proving period. In addition, a corporation established as an affiliate of an existing institution would be eligible (in certain circumstances) for the supply of capital from the parent institution, as well as from donor members. The proposed corporation could be established by a decision of the competent organ of the intergovernmental financing organization, possibly combined with an agreement with donor Governments and institutions. If none of the organizations cited above were willing to establish an affiliate organization, the proposed corporation could be established as an independent institution. The feasibility of its establishment would depend on the willingness of the international community to provide the necessary capital. The political will for this effort had not so far materialized in the General Assembly.

(d) Increasing the role of foundations in anti-desertification research and training

20. The study concluded that although foundations, if properly approached, might play a certain role in providing resources for undertaking research and training, their contributions were not likely to be sufficient to cover all the needs of the countries affected by desertification.

21. The study also dealt with other subjects, such as a Financial Plan for Combating Desertification and Methods for the Mobilization of Domestic Resources.

3. *Feasibility Study on Detailed Modalities for Financing the PACD (1981)*

22. This study took as its point of departure the two earlier studies and attempted to evaluate the different proposals they put forward on the basis of feasibility and practicability.

(a) Feasibility studies and concrete recommendations for the implementation of the additional means of financing

23. The following additional measures of financing were singled out for special attention:

- Generalized trade taxes;
- IMF gold sales and Trust Fund reflows;
- Link between SDR and development finance;
- The Common Fund for commodities;
- International revenues for sea-bed mining;
- Taxes on 'parking fees' from geostationary communications satellites.

(b) Detailed modalities of obtaining resources on a concessionary basis;

this subject is treated in Chapter 4.

(c) Feasibility study and working plan for the establishment of an independent financial corporation for the financing of desertification projects.

24. The feasibility study was carried out under the following subject headings:

- Equity of the corporation;
- Research fund;
- Operating expenses;
- Management of the corporation;
- Demand for loan funds;
- Estimate of potential supply;
- Availability of loans from the corporation;

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- Funding of research and experimentation;
- Terms of the loans;
- Responsibility for the loans;
- Comparison with IDA and IFAD concessionary loans;
- Project implementation, control and monitoring;
- Procedure: establishment of the corporation.

A draft charter of the Corporation, in the form of 41 Articles of an Agreement, was also presented.

C. NEW OPERATIONAL METHODS/MECHANISMS FOR FINANCING NATURAL RESOURCES MANAGEMENT ESTABLISHED OR PROPOSED WITHIN THE UNITED NATIONS SYSTEM

1. *Established methods/mechanisms for financing natural resource management*

25. As distinct from the very important traditional sources of funding, such as the regional development banks and UNSO, the new operational methods/mechanisms for financing natural resources management may be grouped into those already in operation and those still under discussion. Among those already established are the following:

(a) Tropical Forestry Action Plan (TFAP):

26. This is a cooperative arrangement between the World Bank, FAO, UNDP and the World Resources Institute, which acts, with FAO in the lead role, on the basis of a defined Action Plan. There has been provision for a small secretariat of six professionals in FAO's Forestry Department since 1985. Essentially, TFAP functions as a clearing-house for national plans of action with funds provided by donors on a case by case basis. Projects range from the training of foresters through the establishment of forestry research facilities to actual reforestation and forest-based industries with a total estimated cost of over $400 million. Projects also have emerged from the process.

(b) The Energy Sector Management Action Programme (ESMAP):

27. In 1983, the World Bank and UNDP jointly launched ESMAP as a pre-investment facility. In the wake of the oil crisis, their principal objective in creating ESMAP was to identify viable economic projects for multilateral funding. The ESMAP secretariat is located in the World Bank (with a core contribution of $3 million in terms of staff provided). In 1990 it had no less than 55 full-time professional staff with a budget of approximately $16 million (of which 11 per cent covered overhead expenses). Since its initiation (a period of seven years), ESMAP has done well with: (a) pre-investment and pre-feasibility studies in 60 countries; (b) provision of technical assistance and policy advice on energy sectors to developing countries; and (c) financing of modest efforts to improve stoves, expand fuelwood forests and introduce new types of renewable energy. It should be noted, however, that of a total obligation of $23 million (1989) for 80 ongoing activities, no less than 80 per cent was devoted to policy and planning activities and the rest (20 per cent) to actual projects for energy efficiency and conservation.

28. Donor funding of ESMAP activities has remained small and uncertain. Equally lacking is commitment on the part of developing countries to follow through on initiatives. These factors probably account for ESMAP's relatively weak capital investment activities.

(c) International Fund for Agricultural Development (IFAD):

29. Created in 1977 as a United Nations agency to cater to the needs of small farmers and the landless poor in developing countries, IFAD is funded almost equally by OECD and OPEC countries and its voting power is tripartite (OECD, OPEC and developing countries). In the relatively short time since its inception, IFAD has done remarkably well with a secretariat of 231 (of whom 98 are professionals) and operating costs of approximately $44 million. Special Programming Missions to identify problems and possible projects have been undertaken and a large number of projects actually launched. Most of the projects are co-financed with the World Bank and the regional development banks. IFAD also depends on FAO's Investment Centre for technical advice and consultancy. Donors, notably USAID and GTZ, have carried out favourable evaluations and are generally satisfied with IFAD's performance (as are the recipient countries), both as to the raising of funds and carrying out of projects, which are medium-sized endeavours ranging from US$12 - 25 million each, aimed at grassroots agricultural development to raise food production through activities that generate income. The replenishment of IFAD's funds, however, is less and less certain as the income of the OPEC countries diminishes.

(d) The Tropical Diseases Research Programme (TDRP) co-sponsored by the World Bank and UNDP:

30. Co-sponsored by the World Bank and UNDP, TDRP was launched in 1975 to intensify research on the major tropical parasitic diseases. It is managed by a Joint Coordinating Board of (a) 30 members representing donors, (b) 12 members representing affected countries and (c) co-sponsors. The donors retain control and, in effect, have contracted WHO to perform specific functions. There are various elements in the functioning of TDRP that could be of interest with regard to the financing of anti-desertification programmes. These include:

- Various scientific, advisory and steering committees that help WHO in executing research programmes (similar arrangements to assist UNEP for anti-desertification research and implementation could be envisaged);

- A sophisticated information management system, which widely disseminates research results (UNEP could do likewise);

- A rigorous schedule of review and accountability built into the system;

- More than 650 activities undertaken per year (a figure that has recently been increasing), for which developing countries contribute over half of the funds (an important lesson for anti-desertification programmes);

- The participation of a wide range of institutions and the attraction of more than $200 million in voluntary contributions enlisted during the first TDR decade of activity;

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- A sharp budgetary rise since TDRP's establishment to an average of nearly $30 million between 1980-1986, of which a modest 9 per cent is allocated to administration, 66 per cent to research and development, and the rest to training and strengthening institutions.

(e) The Consultative Group on International Agricultural Research (CGIAR):

31. Established in 1971 as an informal association of: (a) over 40 countries; (b) international and regional organizations; and (c) *private foundations* with the objective of supporting international agricultural research centres, CGIAR now has 13 centres, most of them in developing countries. The Group has no formal charter, but the World Bank, FAO and UNDP are co-sponsors and the secretariat is located in the World Bank, which manages financial affairs with the assistance of a technical advisory committee whose secretariat is located at FAO in Rome. Based on annual pledges, total contributions in 1988 came to $261 million, the USA, Canada and Japan being the largest donors. CGIAR's relevance as a model for anti-desertification programmes and projects lies in the provision of research, rather than in design and implementation.

(f) The Interim Multilateral Ozone Fund:

32. The Contracting Parties to the Montreal Protocol (1987) decided at their second meeting in London in June 1990 to establish an Interim Financial Mechanism for the three-year period from 1 January 1991 to 31 December 1993. The Interim Financial Mechanism was founded to provide financial and technical cooperation, including the transfer of technologies, to the Parties that meet the criteria of the Montreal Protocol to enable their compliance with the control measures set out in that instrument. The Financial Mechanism is expected to meet all agreed incremental costs of such Parties incurred in the process of their compliance. It includes a Multilateral Fund of $160 million, which could be raised by another $80 million during the three-year period during which it is expected that more countries will become Parties to the Protocol.

33. The Multilateral Fund:

(i) Meets, on a grant or concessionary basis as appropriate, and according to criteria decided upon by the Parties, the agreed incremental costs;

(ii) Finances clearing-house functions to:

- Assist Parties that meet certain criteria, through country-specific studies and other technical cooperation, to identify their needs for cooperation;

- Facilitate technical co-operation to meet these identified needs;

- Distribute, as provided for by the Protocol, information and relevant materials, and hold workshops, training sessions and other related activities for the benefit of Parties that are developing countries;

- Facilitate and monitor other multilateral, regional and bilateral cooperation available to Parties that are developing countries.

34. The Multilateral Fund operates under the authority of the Parties, which decide on its overall policies. The Parties established an Executive Committee to develop and monitor the implementation of specific operational policies, guidelines and administrative arrangements, including the disbursement of resources for the purpose of achieving the objectives of the Fund.

(g) Technical Assistance for the Mediterranean Countries:

35. The World Bank and the European Investment Bank are providing support for regional technical assistance efforts in the Mediterranean, whose objective is expanding the scope for investments in collaborative international action programmes.

(h) Japanese Trust Fund at the World Bank:

36. A basic constraint in the development of environmental projects in the World Bank has been lack of funding for preparatory work. To meet this situation, a Technical Assistance Grant Programme for Environment was initiated in 1989 to fund the technical preparation of projects that would otherwise be a cost to the recipient countries. The new grant programme is designed to accelerate the preparation of innovative environmental projects by the World Bank. With seed funds provided by the Government of Japan, it is hoped that the technical assistance programme will have a positive impact on the number and quality of the environmental projects of member nations. The programme places special emphasis on such areas as:

- Strengthening environmental policies, institutions, information systems and education, via investment and adjustment operations;

- Land management, including land/resource surveys;

- Forestry projects that have afforestation and prevention of deforestation as major objectives;

- Conservation and protection of natural heritage, biodiversity and cultural property;

- Urban and industrial pollution control and waste disposal.

37. The seed funds Japan pledged to provide are expected to be about US$5 million for the IDA borrowers and about US$10-15 million for the IBRD borrowers. Other bilateral sources have also expressed interest in providing funds for the programme. All developing country members are eligible for assistance, and approval of specific proposals depends on whether the proposed projects are consistent with each particular nation's overall environmental priorities. These priorities are established after discussion with the Government concerned on the basis of Environmental Issues Papers or through the Environmental Action Plans that countries undertake with Bank support. The normal limit for each individual technical assistance activity is between $100,000 and $1 million. The lower limit is intended to avoid the possibility of dissipating time and resources on a large number of projects with only relatively minor environmental components. The upper limit is meant to ensure a reasonable geographic and sectoral spread of activities.

(i) The Lomé Convention:

38. The fourth Lomé Convention, signed in 1990, commits the European Community to a package of grant aid and other forms of financial assistance (amounting to approximately $14 billion over the next five years) to these African and Caribbean and Pacific (ACP) countries that enjoy special aid and trade relationship with the EC. The first three Lomé Conventions (starting in

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1973) shared a common objective: "to restore and preserve ecological balances". The Third Convention of 1984 placed special emphasis on combating soil erosion and desertification, problems given added urgency at the time by the Sudano-Sahelian droughts. The present Convention explicitly contains a new Environment Title, which encourages Governments to draw up long-term plans for making environmental concerns central elements of national development strategies.

(j) Global Environment Facility (GEF):

39. The Global Environment Facility (GEF) is a three-year pilot programme providing grants and low-interest loans to developing countries to help them carry out programmes to relieve pressures on global ecosystems. It is a cooperative venture among national Governments, the World Bank, UNDP and UNEP. It is a core multilateral fund of approximately one billion SDR. The Facility's four areas of global environmental concern are:

- Protection of the ozone layer from further depletion;
- Reduction and limitation of greenhouse gas emissions that cause global warming;
- Arresting the pollution of international water resources; and
- Preserving biodiversity and maintaining natural habitats.

40. The GEF is based on broad agreement that developing countries need concessionary funding to address these global problems because most benefits accrue to the world at large, while the country undertaking the measures bears the cost. Funds provided by the Facility are, by definition additional to regular development assistance. The second principle is cost-effectiveness; operations that achieve environmental benefits at the lowest unit cost will qualify for GEF grant funding. In addition, to qualify for GEF funds, countries would need to have or be willing to develop a sound overall policy and regulatory and institutional frameworks relating to the four areas of global concern as appropriate. Under specific projects, the GEF would fund technical assistance, training, and the studies needed to strengthen framework. The eligibility criteria for GEF operations is expected to be developed further, flexibility being considered an essential element.

2. *Methods and Mechanisms for financing natural resource management under discussion*

41. A large number of initiatives are currently under discussion, among those described below:

(a) Tax on Fossil Fuel Consumption:

42. The World Conference on Changing Atmosphere (Toronto, Canada, 27-30 June 1988) called upon Governments to "establish a World Atmosphere Fund, financed in part by a levy on fossil fuel consumption of industrialized countries, to mobilize a substantial part of the resources needed for implementation of the *Action Plan for the Protection of the Atmosphere*". This idea was echoed in statements of several statesmen world-wide under the title of "carbon tax".

(b) Proposal on Ecotourism in the International Conservation Financing Project Report prepared jointly by UNDP and the World Resources Institute (September 1989):

43. The number of tourists currently visiting national parks and other nature conservation sites both domestically and internationally has shown a dramatic increase. Ecotourism, as currently practised, raises two concerns. First, in the absence of national strategies for conservation, the natural and cultural resources of many tourist destinations may be adversely affected. Secondly, while many developing countries are deriving substantial income from such tourism, few fully capture the potential resource "rents" from their unique locations and natural advantages. According to a World Resource Institute/UNDP study, "most countries allow the bulk of the tourist revenues to remain in the hands of - often foreign - hotel, travel, and tour operators, and even offer generous investment incentives and tax holidays to these international companies. Such policies not only deprive local governments of badly needed funds with which to maintain their resource base, but also encourage the excessive developments that ultimately despoil it."

(c) Concept of a Global Infrastructure Fund (GIF); a proposal from the Mitsubishi Research Institute (Tokyo 1990):

44. The concept of a GIF is being developed by the Japanese business community, under the leadership of the Mitsubishi Research Institute, as a way to promote the development of global infrastructure, mega-scale public works projects for such purposes as the repair of destroyed environments, construction of flood control systems, and the development of international transport communication networks and of water resources. The first in a list of "exemplary" super projects is "greening of the deserts". However, as each such projects are expected to cost over $10 billion, they have not been considered creditworthy (because of the size or cost) so far.

(d) Proposal by the Italian Foreign Minister (1990) that the level of EC financial resource transfers to developing countries and Eastern Europe be raised to one per cent of GNP:

45. In 1990 Italy proposed that from 1993 onwards, the level of financial resources that the EC transfers to developing countries and to Eastern European countries be raised to one per cent of the Twelve's GNP. Between 1993 and 2000, this would represent an average annual flow of $62 billion. Further, it was suggested that 25 per cent of these funds be directed to the countries on the southern shores of the Mediterranean, 25 per cent to countries in Eastern Europe, and the balance of 50 per cent to all the other remaining developing countries.

(e) Earth Saving Bonds (ESBs):

46. Earth Saving Bonds have been proposed and are the subject of continuing discussion in academic circles as a means of raising funds for environmental protection and resource management. Available to both individual and institutional investors, these bonds would be redeemable in all currencies used to purchase them and their value linked to one of the world's major currencies. (US dollars, Yen, DM, Pound Sterling, etc.). They pay interest to all investors.

47. If the bond yielded 9 per cent, the first half of the yield (4.5 per cent) would be tax free for the investors and the second half would be transferred automatically to an international fund with tax-exempt status devoted to environmental protection and resource management on a global basis. Against the second half, the investor would be permitted a tax deduction in that amount against his gross income.

D. NEW SOURCES OF FINANCING

48. In addition to the financing mechanisms sketched above, there may be new sources of financing that could adequately cover anti-desertification programmes. In this connection, it is worthwhile to note that several developing countries have initiated new schemes and proposals for financing environmentally sound development activities, such as the employment generation scheme in Maharashtra, India. Many NGOs, both in the North and South, have made proposals for better automaticity in funding for environmental concerns.

49. Both the OECD and the EC have been active in establishing a Group of Experts on economic regulations that could be applied to a wide range of environmental issues. Moreover, they could create new public funds for environmental protection and natural resource management and at the same time encourage behavioral changes towards development sustainability.

50. Such charges as those made in accordance with the Polluter Pays Principle, discharge taxes, users' fees, proportional taxation relief, research and development subsidies for environmentally benign products, pricing adjustments and rebates have been generally successful as disincentives to pollution generation and over-use of natural resources wherever applied. More important, although in certain cases regulations such as those dealing with human health play an important role, market-based incentives have specific advantages from the point of view of public policy. They can, for instance, further the development of clean technologies and help to tilt prices in favour of environmentally acceptable products, processes and chemicals. Finally, there is a growing perception that the twin criteria of *simplicity* and *practicability* are best met by the imposition of fees on the use of the environment.

51. It is generally agreed that new modalities of financing should be administratively feasible, create no severe inequities in terms of burden-sharing, and raise no grave difficulties of collection. Although the coordination of different national sources of funds to finance environmental needs often gives rise to complicated issues, it would seem that users' fees meet the three above conditions reasonably well, particularly as the overriding objective is ensuring that the procedures adopted remain as simple as possible.

52. Proposed arrangements for users' fees reflect a new approach based on global partnership. A new order of priorities based on such partnership is also needed. It must be an order in which everyone, from all parts of the world, pays an equitable share into a common pool of resources to combat natural resource and environmental dangers. It is this aspect that is likely to make users' fees acceptable to people in developing as well as in developed countries.

CONCLUSIONS

53. The global community faces a complex urgency. *First*, it is necessary to place in perspective the environmental priorities of the developing countries. The priorities of the South are and will continue to differ from those of the North. Water and land resources are the key concerns of the South. The concerns of both North and South find expression in the sense of global interdependence and the feeling of global partnership that interdependence engenders. It is important, therefore, that whatever the financial mechanism established, it should be based on universal participation and not subject to weighted voting or veto. It follows that institutions such as the World Bank should have a more limited role and the United Nations, with its broader membership, a more active one.

54. *Second*, it is necessary to determine the close inter-linkages among poverty, underdevelopment, trade, transfer of technology, macro-economic policies and the process of desertification. This is made explicit in the International Development Strategy for the Fourth United Nations Development Decade adopted by the General Assembly. There are thus global and non-global issues involved in the financing of anti-desertification programmes. The formulation of the needs of the PACD must be designed so as to attract funding; approaches based on charity must be replaced by a clear understanding and expectation of shared global responsibility and international cooperation. That design also should (a) define desertification more clearly so that the general public can understand it better; (b) include an estimate of the minimum costs of assisting countries prone to desertification; and (c) provide a breakdown of these costs into their different components, such as the implementation of macro-economic policies by the countries concerned; the need for financial resources; technical and human resources; training and education; and transfer of technology.*

55. *Third*, it is necessary to explore all the available modalities and sources-aid, trade, encouragement of corporate initiatives and of cooperative ventures with the private sector, application of taxes, charges, users' fees, incentives and disincentive systems for the use of natural resources. In this exploration, two tasks are particularly important:

(a) To identify the need for additional financing to protect investments (in land productivity, irrigation works, rangeland management systems, etc.) and to contain the risks that new investments may pose to sustainable resource use and to environmental functions; and

(b) To identify a cross-sectoral framework to guide investment plans that will reflect specific institutions, physical and, above all, *policy interventions* that have been made in a desertification-prone country so as to avoid *ad hoc* actions, which can only compound costly mistakes made over time in different sectors.

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* Transfer of technology is a critical parameter that requires a distinction between the transfer of technology as such (the programme) and the transfer of the know-how (which will enable one to build the technology locally). The availability of technology, as well as its costs and sources of financing, will differ accordingly.

Section II

*Possibilities for strengthening and coordinating the activities of funds established for reducing the impact of desertification in various international institutions**

56. Regional bodies and approaches have proved to be the most effective in dealing with anti-desertification programmes. Regional programmes with practical goals that have proved successful include those developed by the Arab League through the Arab Centre for the Study of Arid Zones and Dry Lands (ACSAD); by the African Ministerial Conference on the Environment (AMCEN) through its African Deserts and Arid Lands Committee (ADALCO) and the Intergovernmental Authority on Drought and Development (IGADD); by the Asian NGO Coalition for Agrarian Reform and Rural Development (ANGOCO); by the Inter-State Committee for Control of Drought in the Sahel (CILSS); by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) through its Regional Network of Research and Training Centres on Desertification Control in Asia and the Pacific (DESCONAP); and by the Southern Africa Development Coordination Conference (SADCC). This experience should be fully utilized and further developed. CILSS and IGADD have been performing an effective coordinating role that could be advantageously replicated.

57. As noted, a number of funds or facilities, have been established or proposed in recent years in different international institutions. Although the strengthening and coordinating of the activities of all these funds would be helpful, it is useful to concentrate on those that appear most promising. Among these are the Global Environment Facility, FAO, the International Scheme for the Conservation and Rehabilitation of African Lands, the new IFAD approach to ecological concerns, funding under the Fourth Lomé Convention and the bilateral assistance orchestrated by the Development Assistance Committee of the OECD.

58. The need for strengthening existing funds and increasing the flow of financial resources is a major issue and has been discussed in different chapters. Coordination can be done at *policy level* to accord higher priority to land degradation, soil loss, rangeland deterioration, and anti-desertification programmes generally, as well as at the *operational level*, where regional or national structures can be set up to ensure or encourage cooperation and compatibility in the use of international funds.

59. Coordination must be based on an exchange of data and information on the different agencies' activities. This is not an easy task, either in terms of the number of programmes to be examined and points of convergence to be identified or the mechanisms set up for the purpose, as the experience of DOEM and of IAWGD. The question is perhaps one of will at the level of the governing bodies and the heads of agencies concerned. One possible way could be to identify common goals with different components and emphasize the utility and importance of reaching those goals through the achievement of the individual (though interrelated) components.

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* Paragraph 7 of the General Assembly resolution 44/172 A is not altogether clear as to what subparagraph (f) means by the phrase "established for that purpose". If it refers to the purpose of the previous subparagraph (e), it is referring to "mechanisms involving the cancellation or reduction of external debt". If it is referring to the general purposes of the resolution, then "for the purpose" could be taken to mean "possibilities for reducing the impact of desertification, including reafforestation". The second interpretation is followed in this section.

60. The current initiatives which deserve particular attention are (a) IFAD's approach to the internalization of ecological concerns into its lending operations, (b) FAO's International Scheme for the Conservation and Rehabilitation of African Lands, and (c) the Global Environment Facility established jointly by the World Bank, UNDP and UNEP.

A. IFAD'S EVOLVING APPROACHES

61. The President of IFAD presented a report on Environmental Sustainability and Rural Poverty Alleviation: Operational Issues for IFAD (IFAD document GC.13/L/2) to the Governing Council of the Fund at its thirteenth session in 1990. Among other matters, the report suggested that it would be worthwhile "to consider the modalities of establishing a financial mechanism to channel net additional resources on highly concessional or grant terms towards certain environmental elements of IFAD projects which, although central to IFAD's mandate of rural poverty alleviation, cannot justifiably be financed on current lending terms". This approach has clear points of convergence with the objectives of the PACD.

B. FAO's INTERNATIONAL SCHEME FOR THE CONSERVATION AND REHABILITATION OF AFRICAN LANDS

62. This is an ambitious scheme to develop a conservation strategy for the entire African continent. The purpose of the International Scheme for the Conservation and Rehabilitation of African Lands is therefore to provide a means by which African countries can develop their own programmes to fight land degradation. The Scheme is specifically designed to enable countries to tailor these programmes to meet their individual needs. The Director-General of FAO has pointed out that land cannot be reclaimed or conserved through sporadic efforts or short-term projects; what are needed are long-term programmes, backed by sound land-use policies, and strategies to catalyze their development. To succeed, these programmes must be founded on the concept of participation; ultimately African land can be conserved and rehabilitated only by those who make their living from it.

63. Currently, African nations face severe financial constraints and lack sufficient trained workers and other technical inputs to undertake programmes of the scale required. Fortunately, technical assistance and financing agencies are keen to help, providing they can do so within programmes likely to enjoy long-term success. This Scheme therefore includes a mechanism that enables African Governments and these organizations to work in partnership.

64. Although land mismanagement has a central role to play in the spread of desertification - removing too much, returning too little and cultivating, grazing or cutting too frequently - land degradation can be prevented and even reversed. Soil conditions can be improved, and productivity restored. The efforts to combat such mismanagement deserve priority support in the broad scheme of the PACD. FAO emphasizes that cooperation in the raising of the resources for the scheme should be controlled by recipient Governments, but they must seek outside support from an early stage from donors, financing agencies and NGOs. FAO's Scheme is based on the need to mobilize local, national and international resources for the purpose. It is not clear how the financial and technical resources of the magnitude necessary will be raised. The presumption is that new schemes identifying new approaches to sound land use management would attract the necessary resources at the local, national and international levels. Research and advanced training, regionally addressed, would play a strong supportive role.

C. THE GLOBAL ENVIRONMENT FACILITY

65. As indicated in paragraph 39 above, the Global Environment Facility (GEF) is a pilot programme of more than one billion dollars in Special Drawing Rights established by the World Bank, UNDP and UNEP to provide grants and low-interest loans to developing countries to help them carry out programmes to relieve pressures on the global environment. The Facility also contributes to improved international environmental management and the transfer of environmentally benign technology in four major areas:

- Limiting the emission of greenhouse gases that cause global warming;
- Preserving the Earth's biological diversity and restoring natural habitats;
- Protecting international waters from pollution;
- Preventing further depletion of the ozone layer.

66. Donor countries recognize that they must contribute to developing countries' efforts to limit global warming and to save fragile ecosystems, desertification control being a prime example. While the financial and technological means to tackle the problems are concentrated in the industrialized world, the need to take action is urgent and must be global if it is to succeed. Funds provided through the GEF, which are additional to regular development assistance, offer developing countries the opportunity to demonstrate how development can take place in harmony with global environmental concerns.

67. To qualify for funding from the Facility, a project must relate to at least one of its four specific areas of concern (the economic impact of desertification on the loss of biodiversity is recognized). A further qualification is that a project would not be economically viable in the particular country without support from the Facility. Yet another provision stipulates that only nations that are Parties to the Montreal Protocol on ozone-depleting substances are eligible for GEF funds requested for ozone-protecting projects.

68. The Facility has a Trust Fund managed by the World Bank. Projects supported by the Facility are carried out by the developing country recipients with support from the three founding agencies. Each is responsible for specific tasks within their respective fields of competence. A broad range of non-governmental, regional and specialized organizations will also play important roles according to project and need.

69. UNEP provides scientific and technological guidance in identifying and selecting projects. Under its auspices, a Scientific and Technical Advisory Panel of experts from both industrialized and developing countries gives advice on interdisciplinary scientific and technical issues. As part of its scientific and technological support, UNEP also coordinates research and data collection.

70. UNDP coordinates and manages the financing and execution of pre-investment and, with UNEP assistance, of technical assistance activities. Through the Resident Representatives in its 112 field offices, UNDP plays a key role in identifying pilot projects, communicating with Governments, and coordinating with donors at the country level.

71. The World Bank administers the Trust Fund and is responsible for GEF investment projects. It undertakes project identification, appraisal and supervision with the participation of UNDP and UNEP. As the world's largest

source of support for development projects, the Bank uses its global experience in exploring cost-effective approaches to project design and implementation. In countries whose Governments seek support for their national environment plans, the Bank, in addition to its regular lending, considers funding for the four areas covered by the GEF.

72. To qualify for financial support from GEF, both the recipient country and the project itself must meet strict criteria. The three partner agencies review each proposal. As part of this process, they consult with other specialized organizations, including NGOs.

73. As a result of their review, the three agencies determine whether a project qualifies for GEF support and ensure that, in a cost-effective, technologically sound way, it protects the global environment and respects the interests of the country's people. A project should also contribute to the understanding of global environmental problems and their solutions, which is a particular responsibility of UNEP. Training and other human resource development activities are another focus of the Facility.

74. Only developing countries with per-capita Gross Domestic Product at or below US$4,000 in 1989 are eligible for GEF investments. With these investments comes a range of support. Within the financial limits of the Trust Fund, these may include technical assistance, pre-investment studies, information from the scientific community, and training. GEF support is intended to strengthen environmental policies and to reinforce the institutions that implement them in recipient countries. Indeed, GEF funds may directly support the strengthening of policies and institutions to help achieve and sustain improvements in the global environment. Establishing eligibility for projects is complex. The basic idea is that GEF grants and low-cost loans should support a country's programmes and activities which, while they benefit the environment of the world as a whole, would not otherwise be economically viable for that country.

75. The GEF complements, but does not substitute for, action under existing programmes to achieve its objectives. Thus, a project would not normally qualify, even when it offers significant global benefits in GEF areas of concern, if it is economically viable on the basis of an analysis of domestic costs and benefits. An exception might be made if, despite an attractive rate of return, the operation could not go ahead without GEF involvement.

76. The world's ecosystems and diversity of species represent an invaluable global resource. They contribute a wide variety of goods and services, ranging from medicine through genetic resources for food production, to the regulation of climate and rainfall patterns. Yet many of these ecosystems and species are under serious threat of disruption and extinction. The richest remaining sources of biodiversity are in developing countries. The Global Environment Facility will support the efforts of developing countries to preserve specific areas to ensure the protection of their ecosystems and biodiversity. A number of proposals to protect biodiversity were made for early consideration by the GEF. These ranged from the protection of small island ecosystems, watersheds, and forests to proposals to halt desertification and preserve wetlands. Also included were plans to study possibilities for agricultural-ecological zoning.

D. CONCLUSIONS

77. It is currently fashionable to assert that desertification is not a problem that can be solved by the simple allocation of large amounts of money, in addition to improved design, appraisal, and, above all, effective implementation of desertification control programmes and projects. This claim

is only partially true. The experience of the post-UNCOD period has shown that in spite of improvements in approach, the PACD has not progressed as intended and that the main limitation remains the lack of funds.

78. In this context, the modality developed by IFAD for approaching land degradation through the poorest segments of the population in the rural areas and the broad conservation strategies of FAO are useful, but they require strengthening and coordination with other efforts if their potentials are to be realized. The need for an integrated approach, such as that of the PACD, remains as important today as it was in 1977. How far developments in the context of GEF's project eligibility criteria can help meet the demands of this approach remains to be seen.

79. One other conclusion that emerges clearly is that the budgetary allocations for anti-desertification programmes in different funds and financial mechanisms are totally inadequate for the purposes of PACD. Both the IFAD and FAO proposals deserve greater and more sustained financial support. Desertification is a global environment development problem that should have its place in global programmes and its share of international resources established for supporting global plans of action.

80. Activities related to the implementation of the PACD carried out by different international institutions both within the United Nations system and outside it need to be coordinated and hence made more effective. IAWGD, which is an appropriate vehicle to secure coordination, needs to be strengthened and made stronger in terms of its working agenda, its secretariat and the level of participation of member agencies.

CHAPTER 2

The state of implementation of the Plan of Action and objectives and courses of action to further the struggle against desertification, including an evaluation of the additional resources needed in order to attain the minimum objectives of the struggle against desertification

1. This chapter considers two sets of evaluations:

(a) An assessment of the state of implementation of the PACD and objectives and courses of action to further the struggle against desertification; and

(b) An evaluation of additional resources needed in order to attain the minimum objectives of the struggle against desertification.

2. In 1984 a general assessment of the status and trend of desertification showed that:

- The scale and urgency of desertification presented to UNCOD (1977) and addressed by the PACD were confirmed;
- Desertification had continued to spread and intensify despite efforts undertaken since 1977; efforts were too modest to be effective;
- Areas of productive land affected by at least moderate desertification included 3,100 million hectares of rangeland, 335 million hectares of rainfed croplands and 40 million hectares of irrigated land;
- Rural populations in areas severely affected by desertification numbered 135 million.

3. In 1980, it was estimated that a 20-year world-wide programme to arrest further desertification would require about $4.5 billion a year. Developing countries in need of financial assistance would require $2.4 billion of this amount (i.e. $48 billion during the 20 years).

4. UNCOD had concluded in 1977 that the process of desertification contributed significantly to the degradation of life-sustaining biogeochemical cycles, spread abject poverty and loss of human life, and that the resulting losses in productive capacity (income foregone) amounted to nearly $26 billion per year.

5. In their Introduction to "Desertification: Financial Support for the Biosphere"* (1987) the editors noted:

> "Actions of combating desertification are inseparable from actions of resource development and management in arid and semi-arid lands. Schemes that aim at checking land degradation in pasturelands, rainfed farmlands and irrigated agricultural lands; at sand-dune stabilization; at establishing large-scale green belts; at introducing soil and water

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* Yusuf J. Ahmad and Mohamed Kassas, Editors, *Desertification: Financial Support for the Biosphere*; Hodder and Stoughton, London, 1987.

conservation systems in resource management; or at reclaiming new areas of arid and semi-arid lands, are apt to be costly. Projects involving irrigation schemes are particularly expensive. Such projects are generally non-competitive in terms of market values, especially when compared with prevalent rates of interest. Investments in land-reclamation projects usually do not pay well financially, but their social and humanitarian values as means of ensuring food security and participation in production are immense.

"This situation represents compelling reality that exists not only for the PACD, but for all large environmental programmes which are inherently not self-financing or where a threshold level of capital is needed for effective action - such programmes as the World Soils Policy, the Global Plan of Action for Marine Mammals, GEMS, environmental health programmes to deal effectively with malaria, schistosomiasis, cotton pests and others, pollution of the oceans and of the atmosphere and yet others."

6. An update of the findings reached by the 1991 assessment indicates that the status of global desertification in rangelands has deteriorated still further. Assessment of desertification costs carried out in 1991 were based first, on estimates of the amount of irrigated, rainfed cropland, and rangeland in each of the countries in the drylands. Land use data were taken from the 1986 *FAO Production Yearbook*. For many countries, estimates of irrigated and rainfed cropland had to be made for the amount of such land in the drylands only. For the second step, the amount of land in each desertification class (slight or none, moderate, severe, and very severe) in each country, by major land use (irrigated, rainfed, rangeland), was estimated. This step was the most conjectural because practically no good data are available. Reliance was placed on the opinion of informed persons and a variety of indirect sources, such as local maps, traveller's observations, and experimental plot data. Estimates of the productivity loss of land in each productivity class were as follows: slight desertification, representing a potential productivity loss of less than 10 per cent; moderate desertification, representing a 10-25 per cent loss; severe, presenting a 25 to 50 per cent loss; and very severe, representing a potential productivity loss of 50 to 100 per cent. On the average, for most countries the productivity loss that has already occurred on desertified land is probably close to 40 per cent.

7. The cost of agricultural production foregone because of land degradation in the drylands was estimated globally from data taken largely from published figures for Australia, Canada and the United States. The best data came from Australia. It is recognized that dollar figures for income loss will differ according to the crop grown, government subsidies, marketing policies and other factors. However, it was impossible to take all those factors into account in this analysis.

8. Calculating an average cost of rehabilitating desertified land is also complicated by a number of factors related to differences in national economies. In addition, it is difficult to extract meaningful cost figures for most development projects that have a desertification control component. Rehabilitation costs are rarely identified clearly. Estimates were made after consulting project documents and interviewing knowledgeable persons in agencies such as the World Bank, FAO, IFAD, USAID and UNSO. Distinctions could be made between cost of corrective measures that address desertified lands and cost of preventive measures that address productive land or lands that are not desertified or are only slightly desertified.

9. Off-site (downstream) costs of land degradation can easily equal or exceed on-site (direct) costs. Some of these are the flooding of agricultural and urban areas; the sedimentation of waterways and reservoirs; the pollution

of water supplies with pesticides, fertilizer, and heavy metals; air pollution with suspended particulate matter; obstruction of transport routes; and increasing the rate of global atmospheric change. It has been impossible to assign a meaningful financial figure to such costs.

10. The figures in Table 1* give estimates of world-wide desertification in the three principal land uses: irrigated land, rainfed croplands and rangelands. The area of hyperarid climate zones in the world is 980 million ha, and the total area of potentially productive drylands (arid, semi-arid and dry sub-humid climatic zones) is 5,200 million ha. The 1991 assessment shows that 3,600 million ha of these drylands (70 per cent) are degraded: 30 per cent of the irrigated farmlands, 47 per cent of the rainfed croplands and 73 per cent of the rangelands.

11. As against an estimate of $26 billion per year reflecting losses in productive capacity arrived at in 1980, the 1991 figures, which are more realistic and broadly based, show loss of income due to desertification as $42.3 billion per year, of which no less than $23.3 billion (or more than half) comes from rangeland degradation. This is estimated on the basis of a modest $7 per hectare for rangeland that is at least moderately desertified (as compared to $250 per hectare for irrigated land and $38 per hectare for rainfed cropland, both at least moderately desertified). The loss is the highest in Asia ($20.9 billion), followed by Africa ($9.3 billion), North America ($4.8 billion), Australia ($3.1 billion) and South America ($2.7 billion).

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* Data for the 1980 assessment are contained in UNEP/GC.12/9, 1984, and *Environmental Conservation*, Vol. 11-2, 1984; data for 1991 are based on special studies by Prof. H.E. Dregne (Texas Technical University, Lubbock, USA) and Prof. B. Rozanov (Moscow University, USSR), as revised by a group of experts (April 1991).

Table 1. *Global Desertification in drylands* *

	Irrigated Land			Rainfed Cropland			Rangeland		
	Total m. ha	Degraded m. ha	%	Total m. ha	Degraded m. ha	%	Total m. ha	Degraded m. ha	%
Africa	10.42	1.90	18	79.82	48.86	61	1 342.35	995.08	74
Asia	92.02	31.81	35	218.17	122.28	56	1 571.24	1 187.61	75
Australia and New Zealand	1.87	0.25	13	42.12	14.32	34	657.22	361.35	55
Europe	11.90	1.91	16	22.11	11.85	54	111.57	80.53	72
North America	20.87	5.86	28	74.17	11.61	16	483.14	411.15	75
South America	8.42	1.42	17	21.35	6.64	31	390.90	297.75	76
Total	145.50	43.15	30	457.74	215.57	47	4 556.42	3 333.47	73

	All Drylands		
	Total m. ha	Degraded m. ha	%
Africa	1 432.59	1 045.84	73
Asia	1 881.43	1 311.70	70
Australia and New Zealand	701.21	375.92	54
Europe	145.53	94.28	65
North America	578.18	428.62	76
North America	420.67	305.81	73
Total	5 159.66	3 592.19	70

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* "Drylands" refers to arid, semi-arid, and dry sub-humid regions (excluding hyperarid regions), as shown on 1977 Unesco "Map of the World Distribution of arid Regions".

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12. Desertification economic losses include the cost of production lost because of human-induced land degradation and cost of rehabilitating land already desertified. Table 2 shows how much income was forgone annually in 1991 due to desertification (see also paragraph 17).

Table 2. *Income foregone due to desertification annually*

Continent	Irrigated land [a]	Rainfed cropland [b]	Rangeland [c]	Total
		million $		
Africa	475	1 855	6 966	9 296
Asia	7 953	4 647	8 313	20 913
Australia	63	544	2 529	3 136
Europe	474	450	564	1 488
North America	1 465	441	2 878	4 784
South America	355	252	2 084	2 691
World	10 785	8 189	23 344	42 308

Total income foregone = $42,312,000,000/yr due to desertification

[a] $ 250 per hectare for land at least moderately desertified.

[b] $ 38 per hectare for land at least moderately desertified.

[c] $ 7 per hectare for land at least moderately desertified.

(Source: H. E. Dregne, 1991)

13. Rehabilitating desertified land is a costly process, as shown by Table 3.

Table 3. *Cost of rehabilitating desertified land*

Programmes of Land use	Total area to rehabilitate	Total 20 year of corrective measures
	million ha	million dollars[a]
Irrigated land [b]	43	86 000
Rainfed cropland [c]	151	60 400
Rangeland [d]	1 667	66 680
Total	1 861	213 080

[a] 1990 dollars.

[b] $ 2000 per hectare for rehabilitation of desertified irrigated land.

[c] $ 400 per hectare for rehabilitation of desertified rainfed cropland.

[d] $ 40 per hectare for rehabilitation of desertified rangeland.

(Source: H. E. Dregne, 1991)

14. Most developing countries need external financial assistance to combat desertification. Of the 99 countries covered by this study, 18 were believed to be in a position to finance their own rehabilitation costs. Table 4 divides

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the global area of desertified land into two categories: desertified land in countries not requiring external funding and in countries that do. About 53 per cent of the land lies in the second category. The actual area to be urgently rehabilitated is listed in the last column of the table. It is assumed that all irrigated land can repay the costs of rehabilitation (ca. $2000/ha), 70 per cent of the affected rainfed cropland can repay rehabilitation costs (ca.$400/ha), and only 50 per cent of the desertified rangeland can profit enough from rehabilitation to pay the costs (ca.$40/ha) of doing so. For both rainfed cropland and rangeland, the principal reason why rehabilitation would not be cost-effective is that part of the lands are only marginally productive because they are situated in areas too dry for good yields or have soils that are too sandy or too shallow.

Table 4. *Area of desertified land [a], by major land use, in countries requiring and not requiring external financial assistance for land rehabilitation*

Land Use	Total area desertified	External Financial not required	Assistance required	Area to be rehabilitated in developing countries requiring external financial assistance [b]
		(million ha)		
Irrigated land	43.1	14.6	28.5	28.5
Rainfed Cropland	215.6	72.8	142.8	100.0
Rangeland	3 333.5	1 573.7	1 759.8	880.0
Total	3 592.2	1 661.1	1 931.1	1 008.5

[a] In arid, semi-arid, and dry sub-humid climatic zones, at least moderately desertified.

[b] 100 per cent of desertified irrigated land.
70 per cent of desertified rainfed cropland.
50 per cent of desertified rangeland.

(Source: H. E. Dregne 1991)

15. It should be noted that there may be good social or political reasons for allocating funds to the rehabilitation of marginal lands. Table 5, which shows the picture for the developing countries affected by desertification, reflects repayment feasibility, whose benefit: cost is 3:1. Rehabilitation costs for the desertified lands that are believed to be capable of repaying the costs are presented in Table 5. These figures list total direct costs of rehabilitation over a 20-year period, a staggering $131,000 million. No attempt has been made to discount the costs at various interest rates. The unadjusted annual costs of the 20-year costs are listed in Table 6, which shows total cost divided by 20. Income foregone is estimated at $342,000 million. This is the direct cost if no rehabilitation is undertaken, indirect costs that are not included here may be higher.

Table 5. *Estimated total cost and benefits of twenty-year programme of basic measures to rehabilitate desertified lands in developing countries requiring external financial assistance*

	Desertified area to be rehabilitated [a]	Medium cost of programme of basic corrective measures	Income forgone if no rehabilitation undertaken
	(million ha)	(million US$) [b]	(million US$) [b]
Irrigated land	28.5	56 000	142 500
Rainfed cropland	100.0	40 000	76 000
Rangeland	880.0	35 200	123 200
Total	1 008.5	131 200	341 700

[a] In arid, semiarid, and dry subhumid climatic zones, at least moderately desertified: 100 per cent of desertified irrigated land, 70 per cent of desertified rainfed cropland and 50 per cent of desertified rangeland.

[b] 1990 dollars.

(Source: H. E. Dregne, 1991)

16. The above estimates relate only to the rehabilitation measures in all drylands that are at least moderately desertified (Table 3) or in part of these lands (Table 5). They do not include costs of preventive measures that would avert deterioration in non-desertified drylands or halt it in slightly desertified drylands (up to 10 per cent loss of productivity in irrigated and rainfed croplands and up to 25 per cent in rangelands). Table 7 gives global estimates of cost of a comprehensive programme that would include:

(a) Preventive measures in productive drylands that show 0 to 10 per cent loss in productivity in croplands and 0 to 25 per cent in rangelands;

(b) Corrective measures in productive drylands that are moderately desertified (10 to 25 per cent loss of productivity in croplands and 25 to 50 per cent in rangelands);

(c) Rehabilitation measures in drylands that are severely desertified (25 to 50 per cent loss of productivity in croplands and 50 to 75 per cent in rangelands) or very severely desertified (50 to 100 per cent loss of productivity in croplands and 75 to 100 per cent in rangelands.)

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Table 6. *Comparison of 1980 and 1990 costs of rehabilitating desertified lands in developing countries requiring external financial assistance*

Land use	Desertified area to be rehabilitated	Medium total cost of 20-year rehabilitation programme	Medium annual cost of 20-year rehabilitation programme
	Million ha	million $	million $
Irrigated land			
1980	16.4	12,262	613
1991	28.5	56,000	2 800
Change	+12.1 (+74%)	+43 738 (+383%)	+2 237 (+365%)
Rainfed cropland			
1980	68.0	17 008	850
1991	100.0	40 000	2 000
Change	+32.0 (+47%)	22 992 (+135)	+1 150 (+135%)
Rangeland			
1980	722.6	18 066	903
1991	880.0	35 200	1 760
Change	157.4 (+22%)	+17 134 (95%)	+857 (95%)
All land uses			
1980	807.0	47 336	2 366
1991	1 008.6	131 200	6 560
Change	+201.6 (+25%)	+83,864 (+179)	+4,244 (+179%)

(Source: H E Dregne, 1991).

17. The differences in cost estimates in Tables 3 and 5, on the one hand, and Table 7, on the other relate to measures addressed: preventive measures not included in Tables 3 and 5 and other areas addressed. The estimates in Table 3 do not cover areas that are not desertified and areas that are slightly desertified (30 per cent of the total productive drylands). The estimates in Table 5 address only part of the drylands that are desertified at least moderately (100 per cent irrigated land, 70 per cent rainfed cropland and 50 per cent rangeland), while the estimates in Table 7 cover the total area of productive drylands and a comprehensive programme of preventive, corrective and rehabilitation measures.

18. A programme for financing the implementation of world-wide direct action to combat desertification in 81 developing countries that require assistance (both technical and financial) may be based on one of the following three options:

(i) Providing support for programmes of direct preventive measures in productive drylands that are not desertified or only slightly desertified (about 30 per cent of the productive drylands): total cost estimate: $0.8-2.4 billions per year. (This will not save territories that are moderately desertified from further deterioration);

(ii) Providing support for the above programme plus a programme of direct corrective measures in productive drylands that are moderately desertified (areas with 10-25 per cent loss of productivity in croplands and 25-50 per cent in rangelands): total cost estimate: $2.2 to 6.6 billions per year;

(iii) Providing support for a comprehensive programme of direct measures to combat desertification in all productive drylands (preventive- corrective-rehabilitation): total cost estimate $6.0 to 14.6 billions per year.

19. In all these three options, the following considerations are relevant:

(i) Implementation of the PACD rests with the Governments of the countries menaced by desertification. Developing countries need international support to complement national resources mobilized for the execution of the programmes of actions. National contributions may be modest (especially in the least developed countries) or may be substantial;

(ii) A United Nations study carried out in 1980 (referred to in Chapter 1, Section II of this report) surveyed the flow of aid resources to projects in developing countries that are menaced by desertification. Although there were no projects explicitly addressing desertification, the study estimated that some $0.6 billion annually would provide aid for activities related to combating desertification. This figure may suggest a comparable estimate of $0.85 billion per year at present available to activities related to desertification;

(iii) These cost estimates as a whole do not cover the costs of a programme for insurance against recurrent drought as outlined in Recommendation 17 of the PACD.

Table 7. Ranges of annual costs [a] to combat desertification in the drylands of the world for a 20-Year programme in billion US $

(To stop desertification)

	Protective measure in non-affected or slightly affected lands	Corrective measures in moderately affected lands	Sub-TOTAL	Rehabilitation cost in severely and very severely damaged lands	Grand TOTAL
Cost to 18 industrialized and and other countries not requiring external assistance	0.6 - 1.8	1.0 - 3.0	1.6 - 4.8	2.4 - 3.0	4.0 - 7.8
Cost to 81 developing countries requiring external assistance	0.8 - 2.4	1.4 - 4.2	2.2 - 6.6	3.8 - 8.0	6.0 - 14.6
Total global cost	1.4 - 4.2	2.4 - 7.2	3.8 - 11.4	6.2 - 11.0	10.0 - 22.4

[a] The costs are calculated on the basis of (a) the costs of relevant direct measures at different degrees of land degradation per one hectare in each of the land use categories (irrigated croplands, rainfed croplands and rangelands) and (b) the areas of each of the land use categories affected by different degrees of land degradation (none to slight, moderate, severe and very severe), both for two categories of countries concerned (18 industrialized and 81 developing countries) and for the world. These costs are based on averages taken from site-specific programmes. The variations indicate that they do not depend on the status of development of the country concerned, but rather on the nature of the site treated within each country.

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CONCLUSION

20. A comparison of costs estimated in the 1980 assessment with those estimated in the 1991 assessment is shown in Table 6. The cost increase varied from 95 per cent for rangeland to 383 per cent for irrigated land and 135 per cent for rainfed cropland.

21. It is necessary, firstly, to draw attention to the fact that the percentage increase in the desertified area to be rehabilitated is 25 per cent and the increase in the immediate total cost of a 20-year rehabilitation programme is increased by 179 per cent. Second, these are enormous costs, which are escalating rapidly, reflecting the fact that in dealing with environmental damage, it is highly desirable to take early action.

22. Secondly, although the benefits, even in the 1990 figures, (i.e. averting damage inflicted represented in income losses per year of $42.3 billion) are much higher than the cost of corrective measures (approximately $10.6 billion per year), it would be misleading to attempt a financial cost-benefit analysis because the time profile of the costs and benefits are different. This results from the fact that anti-desertification programmes have a long gestation period and that benefits do not appear until many years later. It is also necessary to determine whether the estimates used represent average or total costs and to try to compute, on the basis of more information, additional or marginal costs.

23. Thirdly, a 20-year world-wide programme, if successfully implemented would:

(a) Add to the world capacity for producing food and reduce threats of famine such as those that ravaged Africa in the 1980s;

(b) Stabilize the otherwise fragile ecosystems in arid and semi-arid territories of the world, and hence minimize their impacts on global climate;

(c) Be economically cost effective.

24. Fourthly, the international costs of anti-desertification programmes should be predicated on the package of national macro-economic policies to be pursued. Because there is a functional relationship between the two, true costs could not be estimated without reference to the latter.

25. A final conclusion reached by the Group of High-Level Experts (Geneva, 10-12 July 1991) was that it may be worthwhile to scale down the cost figures, and thus the need for financing assistance, to manageable amounts by dealing with shorter time horizons (5 years instead of 20 years, for instance); high priority activities (as opposed to lower priority ones; use of available rather than imported technology; and a better estimate of what the countries concerned, both the Governments and the peoples, were contributing in funds and services to drylands management.

CHAPTER 3

Ways and means of promoting, in particular in the developing countries, research into and development of existing and potential technology to combat desertification and procedures for the transfer of such technology on favourable terms, in particular to developing countries

A. TECHNOLOGY DEVELOPMENT AND ITS TRANSFER

1. There is general agreement that lack of technology is not currently a major impediment to anti-desertification measures. Many of the applicable technologies for desertification control are already in the public domain. For example, water harvesting techniques, vegetative control of dunes and soil conservation methods are unconstrained by patents and potentially available to all countries. In this view, an undue emphasis on research and development of new technologies may divert attention from the most serious constraint: the lack of application and the poor applicability of the wide array of technologies that are now available. Lack of application, in this context, refers to the large number of technologies that:

- Exist in the international literature;
- Are locally known ("indigenous technical knowledge");
- Have been proven within previous projects and programmes.

Failing to utilize these sources effectively represents a loss of years of accumulated experience too great to be quantified even approximately. The main obstacles to the use of available technologies appear to be:

- Absence of short-term benefits;
- Lack of awareness of what is available;
- The vast array of sources of relevant information;
- The scarcity of experts with the necessary breadth of knowledge;
- Site-specific character of desertification control methods (e.g. trees adapted to one site are not adapted to another);
- Preference for high-technology imported solutions, and neglect of known, simple techniques.

2. It is necessary to emphasize the role of poor application in this regard. Poor application arises where technologies:

- Are transferred with little regard to human, social and site differences in the recipient region;
- Are implemented solely by technical personnel;
- Fail to address the livelihoods of the local people who are expected to implement them and whose effective participation is an essential element of success.

3. It is also a discouraging but undeniable fact that many projects, although well-meaning, attempt to implement technologies within the narrow disciplinary experiences of the project designers rather than on a balanced assessment of local human and environmental conditions.

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4. These considerations underline the special value of assisting the desertification-prone developing countries to develop their endogenous scientific and technological capabilities that would enable them to manage the various aspects of technology transfer and adaptation.

B. NEED AND IMPORTANCE OF APPROPRIATE TECHNOLOGY AND ITS TRANSFER TO DEVELOPING COUNTRIES

5. In 1977 the PACD drew attention to the need for research into technologies to combat desertification and their development. It noted:

> "[Action is required to] give due attention to the modification of technologies to suit local conditions, taking into account social, cultural and economic factors, and ensuring a proper combination of local and imported technology" (Para 75).

6. The PACD also stressed the integration of anti-desertification measures into comprehensive development plans, and presented a broad holistic view of the promotion of technical measures within the context of the socio-economic conditions of the people in the affected areas, as well as of the capacity of agencies and national and international institutions to address multi-sectoral issues. Technological improvements in crop production, whether low-input or high-input, can reduce needs to cultivate new lands by increasing production on the better-endowed, less fragile lands. The Green Revolution, whatever its faults, has done that in many countries. France and the United Kingdom, for example, now are concerned about excess food production. In addition, the PACD indicated that attention to socio-economic causes had lagged behind technical consideration. However, it did not specifically address *how* desertification control measures might be designed, and *how* the necessary breadth of thinking could be fostered in technical specialists who are expected to play a key role in the struggle against land degradation. In practice, despite some efforts to promote integrated analysis of technological, social and developmental issues, the situation remains largely unchanged today.

7. The experience of the last four decades has shown that the selection and use of appropriate technology must be given high priority in the quest for agricultural productivity. In this context, sustainable development of land resources, including the choice of appropriate technology, must be defined not only in terms of the labour and capital endowment of a country or a region, but involves a three dimensional point of view encompassing environmental, economic and social considerations.

8. The emerging agricultural technologies exhibit certain encouraging features. Preliminary studies indicate that the new technologies are generally likely to have a benign impact on the environmental functions and the natural resource base for two reasons. First, most of the technologies are expected to increase productivity and thus reduce the pressures that may jeopardize prospects for meeting future agricultural and food needs. Second, most of the technologies deal with biology and informatics, rather than mechanical and chemical techniques, factors that have caused so much damage in the past. Some technologies may also provide the potential for reducing costs and capital requirements (per unit of output) at the producer level.

9. However, there are certain disquieting aspects related to the accessibility of the new technologies. Because of the research and development costs involved, these technologies will probably have a higher degree of proprietary protection than their predecessors, and there is likely to be an increased concentration of firms in industry as well as in agriculture that may push input prices upwards to the detriment of anti-desertification programmes. Such development will be especially disturbing for areas with poor resource endowments, where low-cost inputs and

technology are vital. The development and application of certain techniques also show a lack of appreciation of the complexities of varied agricultural systems or indifference to smallholder conditions and exhibit a tendency to overvalue increases in output to the exclusion of socio-economic consequences. In the last analysis, ecology must define the productive use of technology. Although the limits vary from one economic system to another, there are certain ecological imperatives that must be respected.

10. A strong policy effort is therefore needed (a) to promote on-site, inexpensive research and development of existing and potential technologies to combat desertification, and (b) to counteract the adverse aspects in the transfer of such technology. Open access to the emerging technologies and the opportunities they represent for developing countries and the poor farmers of such countries should be encouraged. The case for a regenerative and ecologically cleaner agriculture must be clearly stated. In most developing countries this is a role that only Governments can undertake. International programmes should assist Governments in this area.

11. Advances in the field of biotechnology present good prospects, but have become costly. The US Congress Office of Technology Assessment forecasts the emergence of 150 biotechnologies in 28 different areas, ranging from plant to animal genetic engineering, plant growth regulators and animal reproduction, to monitoring and control technology and telecommunication. Many of these technologies are already being marketed; others are still at the laboratory stage. Privatization of agri-biotechnologies and the associated restrictive patent property rights suggest the need for an international mechanism for technology transfer. The development and strengthening of the FAO Global System for the Conservation, Availability and Use of Plant Genetic Resources may provide the required mechanism.

12. The selection of an appropriate technology from the many possibilities available is not an easy task. In their agricultural food production, the developing countries face different endowments in terms of natural resources, customary and traditional agro-economic practices, patterns of cropping, institutional settings, credit systems, expertise levels, and social attitudes that should be taken into account in considering a technology that would be both environmentally and economically sound.

13. An international research programme in this field should incorporate the following features:

- Adequate financing;
- Dialogue and active co-operation with industry to help in research and development efforts to develop and introduce processes, chemicals and products that will lead to significant and rapid advance in the struggle against desertification;
- Dissemination of information and transfer of technological options, where substantial economies are involved, to desertification-prone countries;
- Identification of opportunities and constraints in attempting to achieve break-throughs in innovative technologies that are resource caring and environmentally sound;
- Further investigation and research into the economic and social consequences of land degradation and the factors involved in a transition to agricultural practice and approaches that help to maintain the carrying capacity of land.

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C. ACCESSIBILITY OF TECHNOLOGY

14. Accessibility to the right technology is a major constraint in anti-desertification programmes. This was also recognized in the PACD:

> "In many cases, technical solutions are available now, but their application can be impeded by social, legal and sometimes institutional factors. However, in developing countries the lack of financial resources constitutes one of the greatest obstacles to this application."

The challenge is the need to match accessible technologies to local circumstances. In meeting this challenge, FAO, UNDP, UNSO, UNIDO and other bodies have made a critical contribution. The challenge involves the implementing agency's knowledge of the entire spectrum of existing technologies, understanding the detailed local circumstances, and designing clearly defined criteria to match the two. These design criteria and the ability to build a decision-making structure that will choose the right technologies for the right circumstances: i.e. making the technology accessible to the problem it is intended to address, can be identified as follows:

- Technical effectiveness: have the technologies proved to be effective counter-measures in broadly similar environments?
- Adaptability: if the technologies have been shown to be technically effective, can they be adapted for different environments? This requires a specific understanding of how the technologies work.
- Adoptability: are the technologies within the capability and resource availability of land users and of the institutions that help them?
- Developmental: do the technologies support developmental goals, including above all the legitimate needs and aspirations of local communities?
- Environmental: are unintended environmental impacts likely to occur? For example, might additional pressure on adjacent ecosystems cause problems there?
- Social and economic: are the measures acceptable to society as a whole? Some groups in society may be put at a relative disadvantage by the implementation of technologies; other groups may incur excessive costs.

15. These criteria set an agenda for research for choice of technology and for implementation. The objectives are to ensure the applicability and accessibility of all technologies to the people who will implement them.

16. A useful way to integrate these criteria is the construction of a multi-level set of explanations for the causes of land degradation. Such a "chain of explanation" contains explanations that commence at the site with physical symptoms such as falling crop yields or excessive soil erosion. It continues by broadening into land use practices that cause erosion, such as overstocking. Then it examines the resources, assets, skills and technologies of the land users in, for example, the impossibility of supplying additional family labour; widens further to the nature of agrarian society in, for example, distribution of land rights and the gender division of labour; continues with the nature of the State, including conservation laws, effectiveness of institutions and government policies; and concludes with the international world economy, which may well explain desertification in part through foreign debt crises, oil prices and structural readjustment insisted upon by international banks.

17. These are not mutually exclusive explanations. However, each level in the "chain" may prompt possible interventions, the success of which will depend on their compatibility with other levels in the chain. These "pressure-points" for attention should ensure a balanced approach to the causes of the problem. A major problem in desertification control arises from the concentration of all interventions at the site on the physical symptoms of the problem and on the land users who are the immediate cause of the degradation, without at the same time addressing the wider factors along the chain that may provide no alternative to land users but to degrade their environment.

18. Implementation should begin with protecting high productivity lands (better climate, better soils, better water supplies). Those lands, when improved, can relieve pressure on marginal lands while increasing welfare (reducing poverty), as well as food and fibre production. Such lands have the best potential for favourable cost-benefit ratios, making them more acceptable to recipient countries and to donors.

D. CONCLUSIONS

19. Subject to these considerations, all of them germane to a problem as complex as desertification, one can identify a number of technologies that appear to hold significant promise in desertification control. Potentially, all the following are applicable to land uses in rangeland, rainfed arable agriculture, irrigated crops and orchards, and woodlands:

- *Agroforestry*: a number of specific practices has been developed or are already used in dry areas; e.g. shelterbelts, biomass transfer techniques, live fences, fodder banks, fuelwood trees on range lands, fast-growing trees, growing of fruit trees, reclamation forestry;

- *Soil conservation*: various mechanical structures such as bench terraces, contour drains, contour ditches and contour ridges, as well as biological techniques such as mulching, barrier hedges and conservation tillage;

- *Water conservation*: efficient systems of delivery, and water harvesting, broad-bed-and-furrow systems, ridging and tied-ridging, small dams, waterproof membranes;

- *Soil fertility enhancement*: use of organic residues and manures, inorganic fertilizers, green manures, crop rotations, rest periods and fallowing;

- *Alternative income sources*: small-scale rural industry, brick-making, crafts, etc;

- *Renewable energy*: vegetation-based fuels, solar power, wind power, pumping, tubewells and irrigation.

20. World-wide efforts and resources are needed to address the following inseparable issues:

(a) To assist developing countries to develop national capabilities in science and technology and the dissemination of technologies needed for desertification control, the development of land resources in drylands, and renewable energy sources;

(b) To establish or develop existing international institutions capable of assisting developing countries with the technical and managerial problems related to technology transfer;

(c) To provide, within the resources to be made available for implementing the PACD, clearly defined appropriations for assistance in fields of science and technology;

(d) Conservation of nature, including the establishing of biosphere reserves.

21. An international programme in the field of science and technology may include the establishment of an institution (designed like CGIAR or within its framework) to develop a network of (5-6) regional institutes for training; research and development; technology transfer; and monitoring and assessment, as related to combating desertification and development of land-and-water resources in arid and semi-arid territories.

22. Finally, there is a need for the diffusion of technology to farmers, extension workers, local NGO groups and others close to field operations. There is an equal need to establish data banks at national and regional levels, as appropriate. In order to complement and strengthen their activities, it will be worthwhile to have institutes devoted to agriculture in arid and semi-arid regions based on the pattern of ICRISAT and ICARDA.

23. The revival and use of traditional technologies is a subject to which wholly inadequate attention has been paid so far. Yet in countries such as Syria, where such technologies have been used in drylands management, they have yielded cost-effective results.

CHAPTER 4

Possibilities for obtaining loans on concessional terms, from Governments and other sources, to finance the struggle against desertification

1. These possibilities have been a recurring theme in the consideration of the subject by the General Assembly. General Assembly resolution 34/184 of 18 December 1979 requested that the second of the three expert studies carried out should deal with the following issues, among others:

> "The practicality of obtaining loans from Governments and world capital markets on a concessionary basis".

2. General Assembly resolution 35/73 of 5 December 1980, after considering the second study, requested a further study on:

> "The detailed modalities of obtaining resources on a concessionary basis".

3. It is instructive to consider the conclusions reached in the second and third studies on the subject.

A. GENERAL ASSEMBLY STUDIES

4. The second study carried out in 1980 proceeded on the basis of a distinction between loans from foreign government sources and loans obtained from world capital markets.

5. Insofar as the former was concerned, the study noted that concessionary assistance was generally given to the LDCs or to countries in certain regions because of the severity of their geographical problems (e.g. the Sudano-Sahelian region) or because of special ties (e.g. the assistance programmes of Australia and New Zealand in the South Pacific and the French assistance programmes in various parts of Africa). The important factor in obtaining such assistance was the cost-benefit ratio of the particular programmes. Although in many countries attention was now being paid to social costs and benefits, the financial calculations still remained critical to ensure that the project was technically and financially sound. Bilateral assistance programmes gave priority to desert-prone arid and semi-arid areas, although they did not include desertification control as a separate sectoral classification. The fact that desertification control programmes involved rural populations and affected the poorest segments of the population was also taken into consideration.

6. In this situation, it was possible to envisage concessionary terms for anti-desertification projects that identified the favourable cost-benefit ratios and social benefits of anti-desertification programmes from a national point of view, "as well as the high priority that recipient Governments accords them, reflected, to the extent possible by pledges of the necessary counterpart support".

7. The study identified the following points as those to be highlighted in applying for concessionary loans:

(a) Desertification-control projects support priority objectives of bilateral assistance programmes, such as agricultural improvement, rural development, food production, water resources development and basic needs;

(b) Rates of return, even if not in the form of early financial profits, are often high. Studies undertaken for UNCOD showed internal rates of return ranging from 14-51 per cent for projects financed by the World Bank and the Inter-American Development Bank. Broad estimates also indicated potential cost-benefit ratios in order of magnitude of over 3;

(c) Desertification control projects are typically in rural areas and benefit the poorest segments of the population.

8. In regard to concessionary loans from world capital markets the study noted that:

> "By definition, there is an inherent paradox in obtaining loans from world capital markets on a concessionary basis. The reason is that the world's capital markets are commercial and profit-making in nature, so that they do not provide loans on concessionary terms. The principal means, therefore, by which concessionary terms could be obtained for the borrower would be through assistance from third parties through mechanisms such as guarantees of interest and principal, payment of part of the interest charges, advancing the amortization of the loan and blending concessionary and non-concessionary funds."

9. The third study, carried out in 1981 was more concerned with the "detailed modalities" of raising funds on a concessionary basis than with the "practicability" of obtaining loans. These modalities were discussed in the study in terms of:

(a) Resources that could be mobilized through combined subsidy-guarantee/collateral mechanisms;

(b) Alternative guarantee/collateral arrangements:

- *Ad hoc* guarantee arrangements;
- Incorporation in an anti-desertification institution/agency of a callable capital component;
- Collateral arrangement.

These considerations are of specific relevance to the establishment of an independent public corporation for which there was no political consensus in the General Assembly.

B. RATIONALE FOR CONCESSIONAL FUNDING

10. In practical terms, it is necessary to evaluate the environmental benefits of a project, or of its components, in more realistic terms than is done today in the rural/agricultural sector. Desertification-prone countries do not usually have the means to evaluate such benefits or they consistently undervalue them. This conclusion is reinforced by the fact that high discount rates act against activities undertaken to improve the environment, especially when the gestation period (as in the case of anti-desertification projects) is long. It is further reinforced by the fact that when benefits accrue to low income groups (the less privileged with little or no political power), the costs of a project are often magnified and their benefits given little attention. There is a need here for a redressing mechanism based on distribution of benefits. In order to compensate for these elements, which constitute a complex urgency, concessionary financing, particularly grants, is a useful and necessary tool of an effective financing mechanism.

11. The economic rationale for such an approach is to be sought in the effectiveness and efficiency criteria to be used for the allocation of scarce resources. If important benefits are not identified or are

neglected, the allocation criteria clearly will produce less than optimal projects. Moreover, of course, if environmental costs are not included, the priority granted to a given project cannot be justified.

12. Generally speaking, there appears to be a case for concessional or grant financing when anti-desertification activities exhibit certain specific characteristics:

- Where liquidity (cash flow) problems at the local government level may cause reluctance to undertake long-term (but otherwise sound) land and water resource projects;

- When benefits to the poorest segments of the society are involved;

- Where there are global benefits (particularly to nationals of developed countries) from national or transboundary projects; and

- When there are high risks and uncertainty involved in non-action.

C. RECENT DEVELOPMENTS

13. Recent developments have shown that it is possible to consider concessionary funding as an important element in desertification control programmes. The second study (1980) was correct in its assessment that (a) an intermediary development finance institution would be necessary and (b) blending of grants and highly concessionary loans was a modality that needed further exploration.

14. As indicated earlier, the rationale of the GEF, is that developing countries need concessionary funding to address certain large (global) problems because benefits accrue mostly to the world at large while the country undertaking the measures bears the cost. Anti-desertification programmes qualify for inclusion in the categories of projects eligible for GEF funding because of a number of reasons, including the following:

(a) The rate of desertification is now assuming proportions that amount to a significant global cost. The total area of once productive land lost in recent decades is estimated at over 9 million square kilometres, the present annual rate of loss being of the order of 60,000 square kilometres - a figure that should be compared with the world's present food-producing land area of only 13 million square kilometres. The global nature of desertification is underlined both by the fact that it affects some 100 countries directly and the remainder indirectly and that 20 per cent of the world's population lives in vulnerable drylands bordering the world's deserts. The majority of LDCs are suffering from desertification. As the 1978 study noted, "desertification is one of the world's major problems involving extensive loss of human life, poverty and the degradation of a vital self-sustaining part of the environment. The annual production losses due to the effect of desertification amount to nearly $26 billion. Expenditures on the order of $400 million annually would be needed merely to achieve *zero increase in land degradation*";

(b) The countries suffering from desertification are so lacking in resources that they are unable to deal with the problem either in their own or in the global interest;

(c) The nature of anti-desertification programmes and projects is such that they cannot qualify for funding obtained on commercial terms (interest rates and repayment periods): outright grants or highly concessionary terms are clearly needed;

(d) Although anti-desertification projects may be seen as primarily in the national interest of the countries concerned, only in a few exceptional cases will such investments produce cash income or increase land value that could be taxed to yield funds that would better enable the Governments concerned (many of them severely indebted and short of foreign exchange) to secure external loans. Indeed, (i) the national benefits of anti-desertification measures do not often appear in the form of readily identifiable and taxable cash flows and (ii) the prospects of collecting betterment charges from beneficiaries of anti-desertification projects are remote or non-existent;

(e) In one area, anti-desertification programmes have a specifically global magnitude. This relates to research and field experiments in dealing with the problems of desertified lands that would benefit the affected countries, but are clearly outside their financial and technical capacity to undertake in a purposeful manner.

15. Finally, in contrast to attitudes of a few years ago, the need to finance the PACD is no longer viewed by the international community as a need to transfer to the developing countries resources to assist in the development process, but as a means to meet the requirements of an urgent international programme. There is increasing recognition that desertification is a distinct and priority concern that calls for massive and sustained action at a global level. There is little justification either in conceptual or practical terms not to include anti-desertification programmes in the GEF mandate.

The role of grants and loans on concessionary terms

16. It is possible to go one step further and to consider, now that the operational problems of identifying an intermediary mechanism and blending concessionary and non-concessionary funds have been tackled in the GEF (as they have been earlier in the case of revenue-raising mechanisms employed by national Governments), the necessary role that grants and loans on concessionary terms can play in dealing with resource management and environmental problems.

17. A basic element in anti-desertification programmes and projects is the reconciliation of the short-term need, or survival strategies, of the rural poor with the long-term requirements for a sustainable resource use, i.e. the maintenance of the carrying capacity of land. The link between the two requirements lies in the development and transfer of appropriate, environmentally sound technology. Developing countries, particularly the desertification-prone countries, need assistance to meet the incremental costs involved in the process of transfer. Clearly, they cannot be met from either their own meager domestic resources or foreign assistance allocations earmarked for other essential and urgent economic and social development needs. In view of the burden of the external debt and lack of foreign exchange earnings, the assistance must also be on the basis of grants or loans on highly concessional terms.

18. Apart from the question of transfer of technology, there are two basic economic issues that anti-desertification projects must face. The first is whether the resource management and environmental impact of projects should receive concessional terms. The second is the establishment of criteria that will allow such components to be identified. It will be seen that the financing mechanism(s) envisaged (grants or loans) determine the selection of projects, if these are implemented from one specific source. Anti-desertification projects would continue to be neglected or ignored and their design ineffectively or inefficiently realized if the financing mechanism(s) does not take into account environmental concerns. In other words, there is a strong case for grant financing* if the environment/poverty conflict is to be satisfactorily resolved in terms of national policy.

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D. CONCLUSION

19. The GEF is the first approximation to a financing mechanism that blends concessionary and non-concessionary financing, but other mechanisms are also in the offing and should be encouraged. It is necessary to take a more receptive approach to grants and concessionary financing for anti-desertification programmes. In many such programmes, a specific sustainability criterion - moving away from financial cost-benefit analysis, discount rates, etc. - must be adopted so that complementary measures * are undertaken to realize a given environmental objective. It is obvious that desertification control programmes qualify for consideration among the global issues to be supported by GEF.

20. The establishment of an international corporation for financing anti-desertification programmes on a concessionary basis deserves consideration by international community. The corporation may be (a) an affiliate or subsidiary of an existing international financing institution, or (b) an independent institution. Past experience has shown that grants and concessional loans are not likely to be adequate or appropriate to the needs of anti-desertification programmes. The total amounts will remain limited and further constrained by the needs of Eastern Europe. What is thus needed is obtaining surplus funds for capital investment. Anti-desertification programmes cannot be viewed solely as assistance programmes; they need investment capital (e.g. the recently proposed Arab-Mediterranean Bank).

21. The implementation of a global PACD should be eligible to receive its share of support from future resources established to finance global programmes related to environment and development.

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* The World Bank defines the *grant element* of a loan as follows:

"The grant element of a loan seeks to measure the concessionality of aid funds, extended at a given set of terms, as compared to the same funds extended as a grant (the benchmark). There are five primary factors that dictate the degree of concessionality of a loan as compared with the benchmark: the loan's interest rate, maturity, grace period, volume, and the relevant discount rate. The traditional definition of grant element is the face value of the loan less the present value of debt service payments, divided by the face value of the loan. The grant element is defined here as the difference between the present value of disbursements (disbursements are assumed to be made over an eight-year period) and all debt-service payments, divided by the present value of disbursements."

CHAPTER 5

Possibilities for reducing the impact of desertification, including reafforestation, with the help of mechanisms involving the cancellation or reduction of external debt

A. INTRODUCTION

1. It is becoming increasingly clear that attempts to deal with economic problems in the short term could lead to severe environmental damages that make structural and long-term economic reforms more cumbersome and costly. Indeed, it can be argued that the present economic and financial crises besetting developing countries, and particularly the low-income desertification-prone countries, cannot be effectively addressed except with new, less wasteful and more environmentally sound resource use patterns. The external debt burden of these countries is an outstanding example. What is happening is that in the repayment of that debt, the indebted countries are using much more than their economic surplus. They are making demands on their natural resources and land productivity systems that cannot be sustained and that will lead eventually to critical ecological imbalances for themselves and the global economy as a whole. Unless desertification control practices are profitable (or economically profitable and have positive cost-benefit ratios) in the short term, there is little likelihood that poor countries and agriculturists will devote scarce resources to land conservation. Degradation will continue to reduce the land resources and to increase poverty.

2. In this context, it is worthwhile to compare the financial costs inflicted by the present levels of Third World debt (estimated at over $1.32 trillion) on the debtor countries with the costs of natural resources degradation and destruction, loss of the carrying capacity of land and the spread of desertification in the debtor countries. Are these costs commensurate? Could they be linked? In other words, can the need for sustainable development be reconciled with the inimical conditions created by the increase in real interest rates, balance of payment difficulties, and unwise investment of borrowed funds?

3. A number of conclusions can be drawn. First, for many of the countries concerned, the present debt servicing charges are inevitably unrealistic and unsupportable: repayment of the principal and interest payments are not only in jeopardy, but also at risk.

4. Secondly, that debt overhang severely restricts the flow and rate of further investments because the investments cannot be properly serviced unless the debt stock is reduced or economic performance sufficiently improved to reach a viable debt servicing capacity. Furthermore, debt servicing also diverts resources from investment purposes, including investment for environmental protection.

5. On a rising curve of concern is the degradation of the global commons, and particularly the rapid destruction of tropical forests, which play a vital role in the planet's life support systems. Conservationists see a direct link between the debt-servicing burden and tropical deforestation. Indeed, most of the world's remaining forests are found precisely in those developing countries with the most crippling debt burdens. Conservationists therefore wish to seize the debt crisis as an opportunity to protect the global environment through "debt-for-nature" swaps.

6. It is interesting to examine the debt structure of the countries suffering from desertification and drought. A striking feature of their debt is that it is limited largely to official creditors, Governments and

multilateral financing institutions, and only a small proportion to commercial entities. Table 2 shows the position of the total 1989 long term debt from (a) official and (b) private sources.

7. The present international debt strategy can be and needs to be improved through a number of innovative actions. These include:

(a) Writing-off by all creditor countries (including OPEC and socialist countries) of their official debt to low-income countries suffering from desertification as a contribution to the PACD;

(b) A new institution that has been proposed and should be created, preferably affiliated to the World Bank, to handle the debt programme of these countries;

(c) Application by the IMF of special provisions available under its Articles of Agreement to allow indebted desertification-prone countries longer periods for repayment of loans, as well as the payment of charges in local currencies;

(d) Similarly, a re-examination of the long-debated question on the allocation of SDRs in this light. When such allocations are resumed, industrial countries might consider giving up their share (or a part of it) in favour of the debt-burdened low-income countries suffering from desertification;

(e) Consideration by the creditor countries of generous provisions (taxation) in their banking legislation, in particular against bank exposure to the highly indebted desertification-prone countries as a net contribution to the PACD.

B. NEW INITIATIVES

8. Two initiatives in the field of debt cancellation are worthy of note, one ongoing and the other under discussion.

(a) *The Special Programme for Debt-Distressed IDA countries of Sub-Saharan Africa (SPA)* launched in December 1987 for a three-year period, and extended recently for another three-year period starting in 1991, is a comprehensive framework for the mobilization and coordination of official multilateral and bilateral financing for countries undertaking structural adjustment programmes. Under this programme, financing is provided for multi-year structural and sectoral adjustment programmes from various sources - accelerated IDA financing, donor co-financing and coordinated financing, IMF financing, relief of ODA and Paris Club debt and the Fifth Dimension scheme to provide debt relief to debt-distressed IDA countries with outstanding IBRD debt. Coordination with donors under the SPA was intensified in the form of a "working partnership". Bi-annual consultations were held by IDA with SPA donors to discuss these issues, as well as the status of the programme and its funding requirements. IDA provided financial and operational status reports at each of these meetings.

(b) *Debt-for-Nature Lease Arrangements*: The essence of this proposal is that a percentage of the principal of the debt should be moved from a borrowing nation's debit column into the credit column line and held in a credit escrow account. In principle, the mechanism works by having the debtor country deposit in an (escrow) account the local currency equivalent of the amount of debt or debt service to be reduced (whether at face value or at a discount). The local currency fund is then used for environmental conservation/protection. The following is a case application:

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Country A obtains a *debt-for-nature-swap* of 50 per cent of a $10 million loan. $5,000,000 would become available in a *credit escrow account* to serve as the source of funds by the world community to *lease* certain hectares of virgin tropical forest for 5 years at $1,000,000 per annum. Country A's debt principal would be reduced automatically by $5,000,000, if Country A as the *landlord* would agree to *lease* these site specific hectares for five years, thus realizing an equal or greater return on the forest than by cutting or burning it. Although country A would not receive the actual payments from the escrow account, interest payments would be cut in half, thus releasing hard currency funds for domestic investments. These released funds could be used to (a) buy new technologies, (b) finance the development of a national environment management infrastructure to inventory and develop management tools for the *leased* area once the lease expired and (c) implement sustainable development projects including anti-desertification programmes. During the period of the *lease*, the international community would be allowed to audit the productivity of the leased area, develop income-generating alternatives, assist country A in devising a management plan for arid and semi-arid lands, etc.

9. *Debt for Anti-Desertification or replacement of land resources programmes swap through the intermediary of the United Nations*: The group of financing experts considered a proposal presented by one of the participants, Senator Abel Salinas of Peru, which would have the creditor countries donate to the United Nations the debt documents at a value less than the market value of the documents. UNEP would give these documents to the debtor countries, on condition that these countries invest funds in local currency in the same amount in programmes to combat or avoid desertification and/or improve of land resources.

10. The Governments of the debtor countries would have to commit themselves to establish by law that, for instance, during the following five years, a percentage of the national budget would be transferred to institutions of the central Government, as well as to regional and local governments so that they could prepare, equip and/or implement programmes to fight desertification.

11. The group held that it was necessary to consider the proposal in three parts:

- Bilateral debt;
- Multilateral debt;
- Commercial debt.

12. Insofar as bilateral debt was concerned, the proposal could very well work. But multilateral debt and commercial debt could prove more difficult. For many developing countries, the servicing of multilateral debt is a serious drain and political will is needed on the part of the major shareholders of these institutions to treat it in the same way as bilateral debt. More work is

clearly needed in this area. Insofar as commercial debt is concerned, the problem is more intractable and calls for a different approach to induce the commercial banks to donate the debt documents. At present, only the least developed countries were acceptable candidates for such transactions.

C. DEBT-FOR-NATURE SWAPS

13. In recent years considerable public attention has been focused on debt-for-nature swaps and certain experiments in Latin America appear to have been successful.

14. An examination of the transactions show that their success depends upon significant support from the World Bank/IDA in a meaningful way. During the course of discussions with donors about the replenishment of IDA 9, questions were raised about the possible role of the World Bank/IDA in support of debt-for-nature transactions. In the Report of the Executive Directors on IDA 9, donors urged IDA to "play a catalytic role in facilitating debt-for-nature transactions in support of sustainable development". A recent Note prepared by the World Bank explores the issues involved in such assistance.

15. The following conclusions drawn by the Note are worthy of consideration:

"The Bank/IDA can be helpful in a number of ways in facilitating/promoting debt-for-nature transactions where they are a natural outgrowth of the Bank's lending and policy dialogue and are in line with its role as a development institution, including:

(i) Working with Governments through policy dialogue and economic and sector analysis to create favourable microeconomic, environmental, and possibly regulatory frameworks that would facilitate these transactions;

(ii) Assisting in resource mobilization for debt-for-nature transactions where they are part of a larger program of environmental action or debt reduction in which the Bank has been involved;

(iii) Providing information to Governments on potential debt-for-nature opportunities, and possibly serving as an intermediary to bring interested Governments, commercial banks, and NGOs together;

(iv) Lending for operations coordinated or co-financed with debt-for-nature transactions that would serve to improve effectiveness or sustainability of environmental actions;

(v) Where there are adjustment loans with environmental components, a portion of such loans may be set aside for debt and debt service reduction, within the guidelines for such operations. In IDA-only countries, Debt Reduction Facility funds could be used to finance these operations.

"The scope for debt-for-nature transactions is likely to remain limited, especially in IDA countries, in view of *inter alia* the limited size of the Debt Reduction Facility, the relatively small amount of eligible commercial bank debt, and the budgetary stringency of the debtors. Moreover, for the Bank there is a need to ensure that the instruments that link debt reduction and the environment effectively complement other instruments for pursuing environmental and debt reduction objectives."

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16. Table 1 summarizes debt-for-nature programmes established as of mid-1990.

Table 1. *Debt-for-nature programmes established as of mid-1990* (in million US$).*

A Country	B Eligible Debt-for-nature conversion	C Actually exchanged	D Eligible for conversion but not yet exchanged	E Total bonds generated by debt-for-nature conversion
Costa Rica	113.50	79.25	34.25	42.33
Dominican Republic	80.00	0.58	79.42	0.58
Ecuador	60.00	10.00	50.00	10.00
Argentina	60.00	0.00	60.00	0.00
Peru	10.00-20.00	0.00	10.00-20.00	0.00
Madagascar	8.00	2.10	5.90	2.10
Zambia	2.27	2.27	0.00	2.27
Philippines	2.00	0.39	1.61	0.39
Sudan	0.80	0.80	0.00	0.80
Bolivia	0.65	0.65	0.00	0.25
Poland	0.05	0.05	0.00	0.05

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* Peter Dogsé and Bernd von Droste; Unesco *MAB Digest* No. 6, 1990.

17. While the total amounts involved are not high, especially when compared to the total of Third World debt (which stands at a little over $ 1.3 trillion), the debt-for-nature swaps are becoming increasingly popular. There is need to have a greater focus and intensification in the operational aspects of the mechanism. Table 2 indicates the composition of the long-term debt of some of the developing countries suffering from drought and desertification.

Table 2: *Composition of long-term debt of some developing countries suffering from drought and desertification*

(Percentage of Total 1989 long-term debt in million US$)

	Official Sources		
	Bilateral	Multilateral	Private Sources
Algeria	22	6	72
Egypt	70	12	18
Morocco*	57	20	18
Tunisia	43	29	28
India	24	35	41
Pakistan	57	37	41
Argentina*	11	8	81
Bolivia*	45	37	18
Brazil*	15	12	73
Chile*	8	25	67
Colombia*	16	37	74
Ecuador*	18	21	61
Mexico*	8	13	79
Peru*	33	14	53
Venezuela*	1	2	97
Ghana	27	65	8
Kenya	26	47	27
Liberia	44	39	17
Nigeria*	38	10	52
Senegal	60	34	6
Zambia	56	30	14
Ethiopia	51	37	12
Malawi	22	73	5
Niger	31	43	26
Sudan	61	17	22
Tanzania	60	34	6

* Indicates highly indebted country.

Source: United Nations list of countries suffering from desertification and drought; World Bank, World Debt Tables, 1990-91.

D. CONCLUSION

18. As noted earlier, the international debt strategy includes several policy initiatives currently under discussion, which should be encouraged. Many OECD countries, the principal sources of bilateral assistance, have announced their willingness to treat debt reduction or cancellation more sympathetically when it is linked to natural resources conservation. In realistic terms, however, the linking of debt cancellation with the financing of programmes to redress desertification suffers from a number of constraints. First, many of the desertification-prone countries are in such a severe state of economic and financial impoverishment that any relief from debt is normally earmarked for actions on a long list of priorities. Funds released from debt cancellation must lead to the allocation of greater resources to protect the environment, re-habilitate land productivity, improve rangelands, extend irrigation facilities, etc., which are all high priority development actions. Secondly, desertification-prone countries are often not willing to allocate funds that become available to

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them to development purposes that include these activities. Finally, the central issue in the financial management of these countries is one of evaluation of emerging needs. In the calculus of needs and benefits (often essentially short-term), projects and programmes would have to justify themselves as major urgent concerns if they are to be given a high place in the list of priorities.

CHAPTER 6

Ways of encouraging the active participation of non-governmental organizations, foundations and individuals in the financing of training and scientific research programmes to combat desertification, including reafforestation programmes

1. This chapter deals with the role of three broad categories of agents in the financing of training and scientific research programmes to combat desertification, including reafforestation programmes. These three groups are:

- NGOs;
- Foundations;
- Individuals.

Ways and means of encouraging the active participation of these groups is discussed in the following sections.

A. NON-GOVERNMENTAL ORGANIZATIONS

2. A large number of non-governmental organizations are involved in trying to halt desertification at the local and community levels. The more effective of these organizations are networks, the others being small bodies of concerned persons who do not have either the funding capacity or the organizational capabilities to take effective action; they limit themselves to raising awareness of the problem.

3. NGOs, especially those from the South, have been playing a key role in combating desertification in three ways:

(a) Advocacy of the environmental issues involved and raising of public awareness of the human, economic and ecological impact of desertification;

(b) Lobbying and campaigning against policies and projects that could have adverse ecological and social impacts; and

(c) Developing small-scale anti-desertification and local environment improvement projects based upon principles of participatory management and equitable distribution of project benefits.

4. During the 1980s, as awareness of the adverse impact and extent of land degradation grew, numerous NGOs in the South took up projects for improved land management. Several of these projects have today become models of community-based anti-desertification projects and have influenced national policies. There is a strong need to support a variety of NGOs in the South to strengthen and further their advocacy, public awareness raising, lobbying and community-based field action roles - not just Southern urban-based, national NGOs, but also small, community-based groups to develop anti-desertification projects. In India, for instance, it has been found that all successful NGOs with good land management projects were those who succeeded in creating or working with effective community-level groups. National NGOs in the South can definitely play an important role in developing training programmes for grassroots ecology management workers and in undertaking studies and analyses of how to integrate people's own traditional knowledge and practices with inputs of modern science and technology. In these activities, they have often received financial support from Northern NGOs, or church-based institutions such as OXFAM, NOVIB and Community Aid Abroad.

5. There is also a need to stimulate interest and activity within the academic and research institutions of the South to undertake socio-economic and scientific research and training programmes. There is a reasonably large scientific and social science community in the South that should be mobilized urgently.

6. For the specific purposes of encouraging interest in the financing of training and scientific research programmes to combat desertification, it appears worthwhile to turn to the substantive and purposeful international NGOs, which are well funded and involved in resource management and environmental quality improvement programmes.

7. It must be accepted, however, that, generally speaking, NGOs are not known or organized for financing training and scientific research programmes. Their rationale and major strength is devoted to:

- Advocacy of environmental and resource management issues;
- Awareness building (southern NGOs have not been fully utilized for this purpose so far); and
- Research and publication.

NGOs also provide good models for popular participation in environmentally sound development. Finally, it is worth emphasizing that universities play an important role and they should expand their NGO-like activities in scientific research. This potential needs to be further mobilized.

B. FOUNDATIONS

8. Foundations were examined in two of the three studies carried out under General Assembly auspices. The first study, carried out in 1978, considered foundations under "Sources of Financing" and came to the conclusion that they could play a useful role, but that their resources were limited and "mostly devoted to special purposes, mainly in research and training. Foundations have been successful as catalysts in these areas, and should be encouraged to participate in financing training and research programmes, for example in the development of drought-resistant crops, solar stoves, sand-dune fixation and the like".

9. In the second study carried out in 1980, more attention was devoted to foundations and comprised an entire section entitled "Increasing the Role of Foundations in anti-desertification Research and Training". The section considered the means of encouraging the participation of foundations, but limited itself to private foundations only (most of which are in OECD countries). The data relating to the private foundations (the total amounts of grants they make, their numbers and areas of activity, etc.) were related to 1978 figures and are not of much practical value today.

10. The study, however, noted that:

- A new kind of agency dispensing assistance for training and research have recently emerged, such as IDRC, SAREC, US Appropriate Technology International, and the Inter-American Foundation, which are oriented towards indigenous research and training projects in developing countries with annual grant-making resources estimated in 1980 to be in the order of $100 to $150 million;
- There were a number of foundations established largely in the Middle East as non-governmental bodies "serving to express the philanthropic interests of their founders" (e.g. the Queen Alia Foundation, the King Faisal Philanthropic Foundation and the Philanthropic Trust of Kuwait). While there are no available

estimates of their resources, currently these foundations might possibly be interested in financing research and training related to desertification control.

11. The distribution of grants made by foundations located in Europe and the USA in 1978 snowed that their primary interests were education, medicine and social welfare. International assistance received less than 10 per cent and anti-desertification research and training was by no means a priority subject area. The study added that "the foundations whi·h are most likely to be associated with the anti-desertification effort were those which already have an interest in the environment. The possibility exists, however, that a few foundations whose interests lie in the fields of education and the earth sciences may be encouraged to participate".

12. The study went on to list the following international foundations as among the better known ones "with an interest in the Third World":

- Ford, Rockefeller, Rockefeller Brothers Fund, Lilly Endowment, W. K. Kellogg, Carnegie Corporation, A. W. Mellon, E. M. Clark and Tinker in the U.S.A.;

- Alfred Krupp von Bohlen und Halbach, Kübel and Volkswagenwerk in the Federal Republic of Germany;

- NOVIB and NUFFIC in the Netherlands;

- Calouste Gulbenkian in Portugal;

- Juan March in Spain; and

- Toyota in Japan.

13. One further point made by the study is that foundations do not generally prepare their own projects. They prefer to contribute to the financing of projects brought to them with all the necessary documentation.

14. Finally, it was pointed out that the CGIAR - whose membership includes foundations, as well as Governments and international organizations - provides substantial assistance to research and training institutes interested in arid and semi-arid areas, notably ICARDA, ICRISAT, ILCA and the IFPRI.

15. The following private foundations interested in resource management and environmental concerns are listed below:

The Aga Khan Foundation
The Allbritton Foundation
Atkinson Foundation
The American Conservation Association
Beldon Fund
The William Bingham Foundation
Botwinick-Wolfensohn Foundation, Incorporated
Mary Flagler Cary Charitable Trust
Compton Foundation
The Nathan Cummings Foundation
Geraldine R. Dodge Foundation
The Gaylord and Dorothy Donnelley Foundation
Echoing Green Foundation
The Educational Foundation of America
The Folger Fund
The Ford Foundation
The Friendship Fund
General Service Foundation
The German Marshall Fund of the United States
The George Gund Foundation
The Luke B. Hancock Foundation
H. John Heinz III Charitable Trust
The William and Flora Hewlett Foundation
Hitachi Foundation
The International Foundation
W. Alton Jones Foundation, Inc.
The Joyce Foundation
The Kresge Foundation
Albert Kunstadter Family Foundation
The Lukas Foundation, Inc.
Luster Family Foundation, Inc.
John D. and Catherine T. MacArthur Foundation
Monitou Foundation, Inc.
Wallace Genetic Foundation, Inc.
Mariner Foundation Trust
Mars Foundation
Robert S. and Margaret C. McNamara Foundation
The John Merck Fund
Joyce Mertz-Gilmore Foundation
The Leo Model Foundation, Inc.
The Moriah Fund
Charles Steward Mott Foundation
The Curtis and Edith Munson Foundation, Inc.
Jessie Smith Noyes Foundation
The Overbrook Foundation
The Frank Pace Jr. Foundation
The Pew Charitable Trusts
Sidney and Joanna S. Pointier Foundation
Public Welfare Foundation, Inc.
Rockefeller Brothers Fund
Laurance Rockefeller Charitable Lead Trust
The Rockefeller Foundation
Sacharuna Foundation
Sasakawa Peace Foundation
Savitt Fund of the Tides Foundation
Schumann Foundation
David Schwartz Foundation, Inc.
L.J. and Mary C. Skaggs Foundation
Alan B. Slifka Foundation
Summit Fund of the Community Foundation of Greater Washington
Surdna Foundation, Inc.
The Tinker Foundation, Inc.
USA for Africa
Frank Weeden Foundation

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C. INDIVIDUAL

16. It is not clear how and on the basis of which criteria the General Assembly expects the individuals it has in mind to be identified. Nevertheless, high-profile individuals could volunteer and play a catalytic role in the financing of the PACD.

D. CONCLUSION

17. NGOs in developing countries have played a special role, not so much in the financing of projects and programmes, but several other equally important roles. First, many NGOs at the developing country level constitute effective pressure groups in favour of environmental action. Secondly, through community groups at the local level, they act in favour of natural resources conservation, including measures that have a direct bearing on land degradation and desertification. Thirdly, these NGOs, because of their knowledge of local conditions and specific ecosystems, could make a substantive contribution to the implementation of anti-desertification activities. Finally, the total package of resources needed for anti-desertification programmes must include a number of components apart from funds. These are human resources, time given to protection of the environment, operational activities in the field, etc. It is this last component in which NGOs are most effective.

18. Foundations have played an important role in supporting activities of organizations that contribute to anti-desertification technologies, such as contributing to ICRISAT and funding research by the CGIAR. Such involvement by foundations in training and research could be further strengthened and coordinated to ensure more effective contributions to anti-desertification measures.

19. Individuals could participate, as has been the case with UNICEF activities, through lending their personal prestige, influence and financial resources to anti-desertification efforts, as well as such mechanisms as the Earth Saving Bonds (which would be more open to the general public than other financing possibilities).

ANNEX I

GENERAL ASSEMBLY RESOLUTION 44/172 A

Plan of Action to Combat Desertification

IMPLEMENTATION OF THE PLAN OF ACTION TO COMBAT DESERTIFICATION

The General Assembly,

Recalling its resolution 32/172 of 19 December 1977, by which it approved the Plan of Action to Combat Desertification,[1] and all its subsequent resolutions on the subject,

Recalling also its resolution S-13/2 of 1 June 1986, by which it adopted the United Nations Programme of Action for African Economic Recovery and Development 1986-1990, which identified measures to combat desertification as a priority,

Bearing in mind the draft resolution to be adopted at the present session[2], concerning the United Nations conference on environment and development, to be held in 1992, fifteen years after the adoption of the Plan of Action to Combat Desertification,

Deeply concerned that the problem of desertification, which has a global impact, is still on the fringe of the growing awareness on the part of the international community that it is imperative to combat environmental deterioration effectively within the framework of the interdependence of nations,

Gravely concerned by the continuing spread and intensification of desertification in developing countries, particularly in Africa, and the indescribable human suffering, economic and financial losses and social disruption caused by that scourge,

Aware that drought and desertification place a considerable burden on the economic and financial capacities of the developing countries affected and that the negative effects of the international economic environment impede their efforts to undertake effective and sustained programmes to combat desertification, for which they bear primary responsibility,

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[1] Report of the United Nations Conference on Desertification, Nairobi, 29 August-9 September 1977 (A/CONF.74/36), chap.I.

[2] See Official Records of the General Assembly, Forty-fourth Session, Annexes, agenda item 82, document A/44/746/Add.7, para. 55, draft resolution V. The draft was subsequently adopted as resolution 44/228.

1. *Takes note* of the report of the Secretary-General on the implementation of General Assembly resolutions 42/189 A, B and C of 11 December 1987 [3] and of the relevant section of the report of the Governing Council of the United Nations Environment Programme; [4]

2. *Expresses its deep concern* about the inadequacy of financial resources for the implementation of the Plan of Action to Combat Desertification;

3. *Urges* Governments, in particular those of the developed countries, United Nations organizations and other intergovernmental bodies to increase and intensify their efforts to combat desertification and to accord the highest priority to the recommendations contained in the Plan of Action;

4. *Invites* the Executive Director of the United Nations Environment Programme to consult the principal international organizations, private foundations, individuals and the major media enterprises that finance or promote environmental protection activities in order to draw their attention to the compelling need to consider desertification on an equal footing with other current environmental issues;

5. *Invites* the United Nations conference on environmental and development, to be held in 1992, to accord high priority to desertification control and to deploy all means necessary, including financial, scientific and technological resources, to halt and reverse the process of desertification with a view to preserving the ecological balance of the planet;

6. *Invites* the Governing Council of the United Nations Environment Programme to contribute substantially to the discussion on desertification at the conference, *inter alia*, by undertaking a general evaluation, sufficiently in advance of the conference, of the progress achieved in implementing the Plan of Action;

7. *Requests* the Secretary-General, in consultation with the Executive Director of the United Nations Environment Programme, to submit to the conference, through its preparatory committee, a report containing relevant expert studies on, *inter alia*, the following:

(a) Relevant suggestions and proposals formulated within the United Nations system on the possibility of utilizing new methods to finance the programmes of multilateral organizations at the global level, over and above regular budgets and conventional extrabudgetary resources;

(b) The state of implementation of the Plan of Action and objectives and courses of action to further the struggle against desertification, including an evaluation of the additional resources needed in order to attain the minimum objectives of the struggle against desertification;

(c) Ways and means of promoting, in particular in the developing countries, research into and development of existing and potential technology to combat desertification and procedures for the transfer of such technology on favourable terms, in particular to developing countries;

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[3] A/44/351-E/1989/122.

[4] Official Records of the General Assembly, Forty-fourth Session, Supplement No. 25 (A)44/25), chap. VI.

(d) Possibilities for obtaining loans on concessional terms, from Governments and other sources, to finance the struggle against desertification;

(e) Possibilities for reducing the impact of desertification, including reafforestation, with the help of mechanisms involving the cancellation or reduction of external debt;

(f) Possibilities for strengthening and coordinating the activities of funds established for that purpose in various international institutions;

(g) Ways of encouraging the active participation of non-governmental organizations, foundations and individuals in the financing of training and scientific research programmes to combat desertification, including reafforestation programmes;

8. *Decides* to close the Special Account to finance the implementation of the Plan of Action to Combat Desertification, and requests the Executive Director of the United Nations Environment Programme to take the necessary steps to do so;

9. *Also decides* that the Consultative Group for Desertification Control will meet every year until the conference on environment and development is held in 1992 and every two years thereafter, and reaffirms its mandate as contained in resolutions 32/172 of 19 December 1977 and 39/168 of 17 December 1984;

10. *Calls upon* the Consultative Group, in cooperation with the Executive Director of the United Nations Environment Programme, to contribute to the enhancement of awareness of environmental issues and to intensify its efforts to mobilize additional resources, to exchange information on scientific research, national programmes and the implementation of the Plan of Action and to give its opinions on the actions to be undertaken in the battle against desertification;

11. *Urges* the Governments of countries affected by desertification to accord high priority, in their national development plans, to medium-term and long-term strategies and programmes for desertification control;

12. *Requests* the Secretary-General, together with the Executive Director of the United Nations Environment Programme and the Administrator of the United Nations Development Programme, to submit a report to the General Assembly at its forty-sixth session, through the Economic and Social Council, on the various provisions of the present resolution, and to ensure that it is submitted, immediately after publication, to the preparatory committee for the United Nations conference on environment and development.

83rd plenary meeting
19 December 1989

ANNEX II

List of Participants in the Meetings for Drafting Expert Studies on Funding Anti-Desertification Programmes

I. Meeting of Experts, Geneva, 9-11 July 1990

Participants

1. Mr. R. Moreno Jr.
Senior Economist
World Bank

2. Mr. S. Morozov
Director
Centre for International Projects,
UNEPCOM,
Moscow

3. Mr. C. Rakotondrainibe
Resources for Development Programmes, UNCTAD

4. Dr. M. Stocking
Director
Overseas Development Group,
University of East Anglia,
United Kingdom

5. Ms. T. A. Saiko
Deputy Chief
Terrestrial Ecosystems Branch
UNEPCOM
Moscow

Senior Advisors to the Executive Director

Dr Y. J. Ahmad (Chairman)
Prof. H. Dregne
Prof. M. Kassas
Prof. B. Rozanov

II. Meeting of Experts,
Nairobi, 21-23 February 1991

Participants

1. Mr. S. Imai
Economist
Environmental Affairs Department,
African Development Bank,
Abidjan

2. Mr. F. Joshua
Economic Affairs Officer
UNCTAD,
Geneva

3. Mr. C. Kahangi
Co-ordinator,
East Africa Region,
African Development Bank
Nairobi

4. Mr. Jin Liqun
Deputy Executive Director for China
World Bank,
Washington D.C.

5. Mr. P. Ndegwa
Economist and former Governor of the Central Bank,
Kenya

6. Mr. A. Salinas
Senator,
Peru

7. Mr. G. A. Brown (Chairman)
Governor, Bank of Jamaica

8. Ms. S. Drouilh
Regional Representative,
UNSO,
Nairobi

9. H. E. Juan Antonio Mateos,
Ambassador of Mexico
to Kenya

10. Prof. S. J. De Canio
School of Economics,
University of California,
Santa Barbara, California,
USA

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Senior Advisors to
the Executive Director

Dr. Y. J. Ahmad
Prof. H. Dregne
Prof. M. Kassas
Prof. B. Rozanov

11. Dr. A. Markandya
Economist,
United Kingdom

III. High Level Meeting, Geneva, 10-12 July 1991

Participants

1. Dr. A. Agarwal
Director,
Centre for Science
and Environment
New Dehli, India

2. Mr. G. A. Brown (Chairman)
Governor,
Bank of Jamaica

3. Dr. D. Ghai
Director
UNRISD, Geneva

4. Dr. Mahbub ul Haq
Senior Advisor to the
Administrator of UNDP,
New York

5. Dr. A. M. Hegazy
Former Prime Minister of Egypt,
Cairo

6. Mr. K. Piddington
Special Advisor
(Environment),
World Bank

7. Mr. H. Mule
Assistant President,
IFAD, Rome

8. Hon. Prof. G. Saitoti
Vice-President and
Minister of Finance,
Republic of Kenya

9. Ambassador C. Thomas
Assistant Secretary-
General,
O.A.S., Washington

Observers

Ms. D. Diane
Administrator, Development
Commission of the European
Communities - Brussels

F. Joshua
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Dr. Y. J. Ahmad
Prof. H. Dregne
Prof. M. Kassas
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